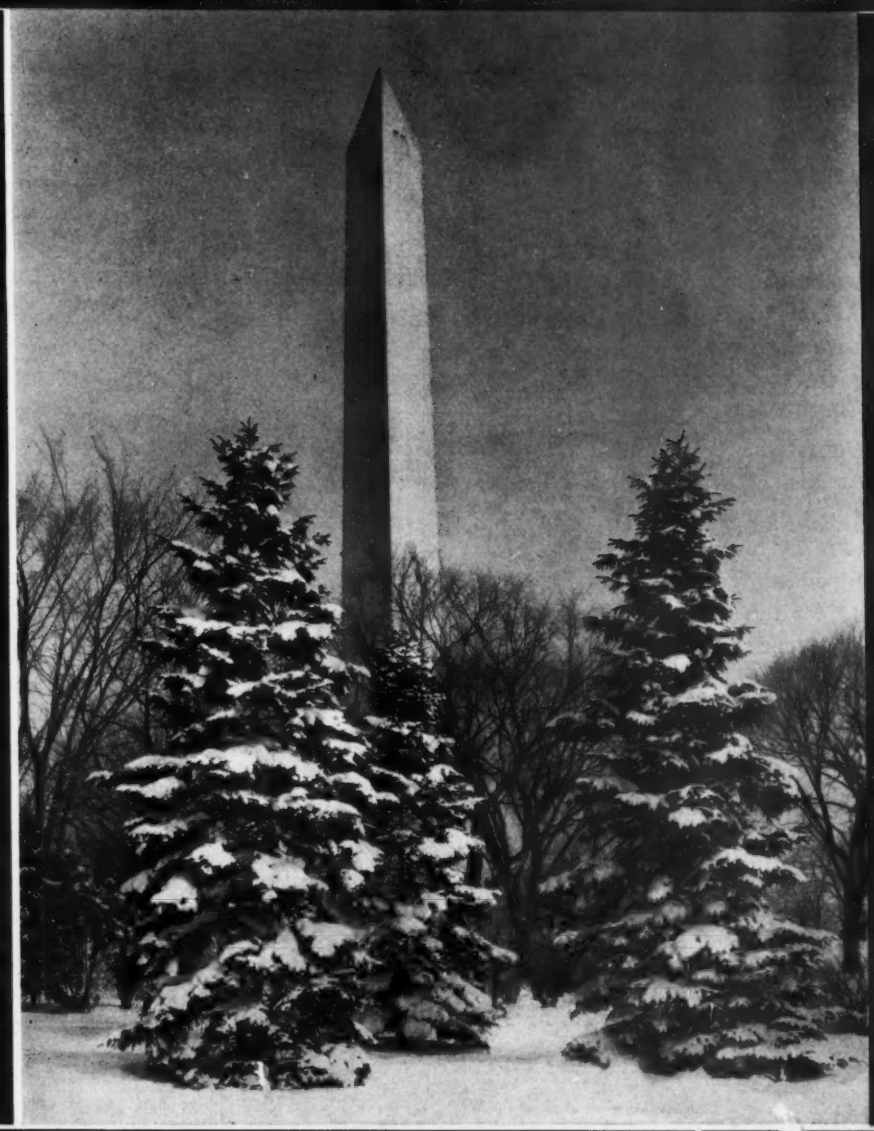
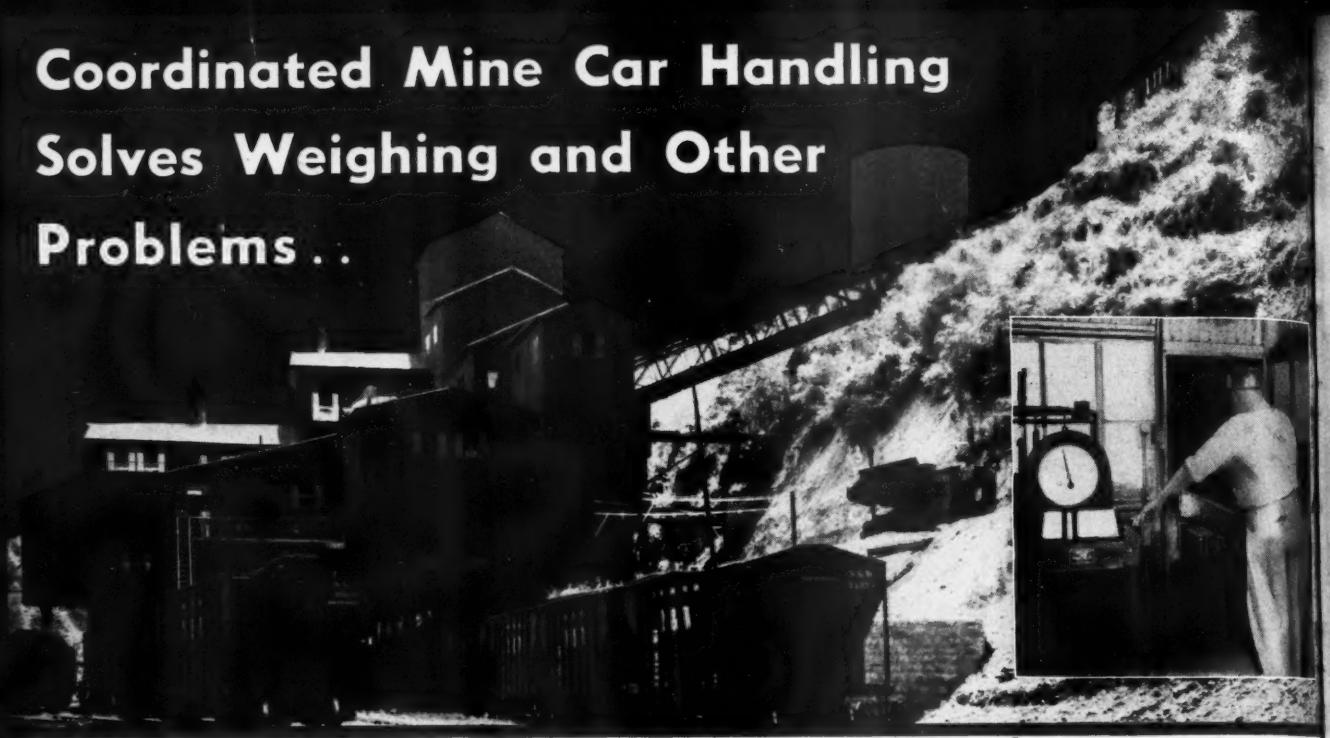
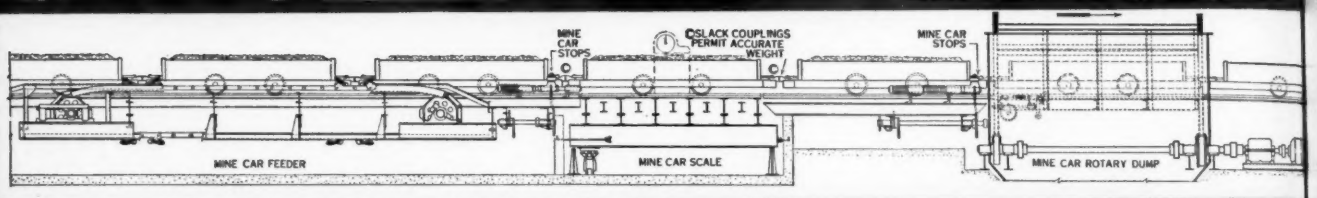
Mining CONGRESS JOURNAL

DECEMBER 1948



Coordinated Mine Car Handling Solves Weighing and Other Problems . .





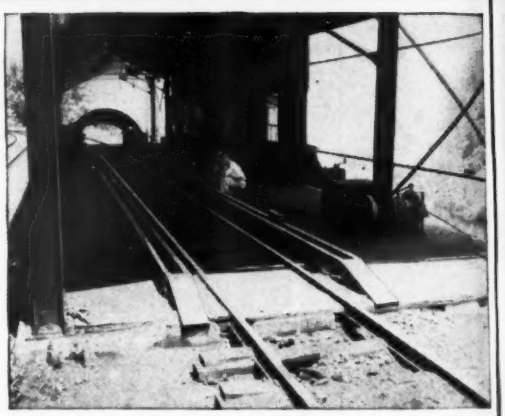
Typical example: Where the miners were paid by the weight of coal in cars, there were complaints of not getting the right weight because of couplings too taut or because bumpers were in contact with the car ahead and behind.

A Link-Belt coordinated mine car handling system provided the answers to this and other problems. Mine cars are now handled entrain at the rate of three per minute, and trips of about 50 loaded cars are fed by a car haul, weighed on an automatic track scale, and dumped in a power operated rotary dump. Only one man is required for the complete operation. The cars are always automatically spaced so that the couplings are always slack — they are not taut and there is no contact between bumpers.

The accompanying sketch and photographs show details of this Link-Belt coordinated mine car handling sytsem. We'll be glad to give you complete data on this and other systems, and coal handling and preparation equipment up to complete plants.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8.



Above: Car haul, automatic spacing equipment and rotary car dumper at weigh house.

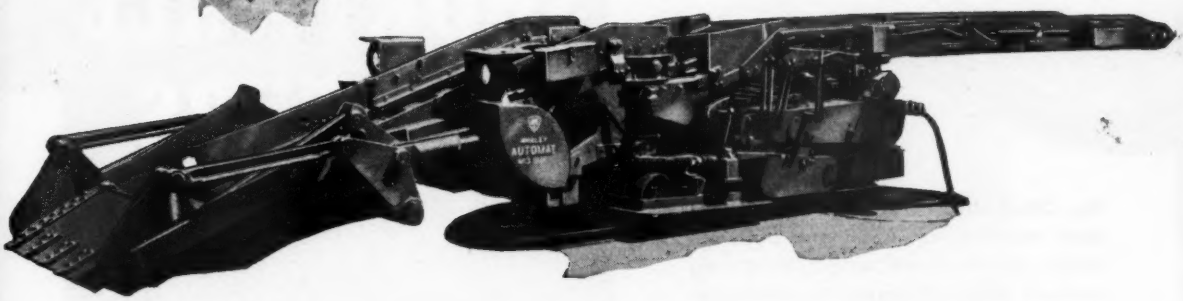
Link-Belt mine car hauls and car dumpers for both mine and railroad cars are made in a variety of types and sizes to meet every capacity and service requirement. They are completely described in Catalog No. 2048-A, sent on request.

COAL PREPARATION AND HANDLING EQUIPMENT

Engineered, Built and Backed by LINK-BELT

As a loader operator I know from Experience...

- FOR SAFE LOADING IN CLOSELY TIMBERED PLACES, I'LL TAKE THE "AUTOMAT"



Ask the men who operate the loaders and they'll tell you why a Whaley "Automat" is safe. Safe loading is an all-important consideration for operators and miners alike. When you're working in closely timbered places and narrow entries, a sudden side-kicking of the rear conveyor can be serious. Knocked out timbers and falls, with possible injury to men, just don't happen around the "Automat." This is another reason why so many mining men have confidence in the Whaley "Automat." It's the only loader available with a loading head that gives you a vertical lift shovel action. All power is directed in a vertical plane, making side kicking impossible . . . making loading a job of maximum safety. For sure loading safety . . . for complete loader service, choose the shovel action "Automat." Myers-Whaley Co., Knoxville 6, Tenn.

Remember, the "Automat" loads, in its stride, any lump of coal that will pass through your tipple, or any lump of rock your cars, aerial tram or larries can take.

Myers Whaley

Mechanical Loaders Exclusively for Over 40 Years.

POWER *and* SIMPLICITY

are combined in

JEFFREY 35-B SERIES

SHORTWALL CUTTERS

The 35-B illustrated is a continuous duty machine designed and built for tough underground service over long periods with minimum maintenance. Considerable time is saved due to the independent operation of the feed and handling mechanism which permits the machine to be sumped . . and the cut across the face started with one setting of the jacks.

Jeffrey SHORTWALL machines are of simple, rugged design with few, slow moving parts and slow speed motor . . thus providing all the essential requirements for reliable performance, low maintenance and continued economy of operation.

Jeffrey has the experience, the plant facilities and the engineering organization to help you. Consult a Jeffrey engineer for information on the unit best suited for your particular job.

JEFFREY

Drills — Cutters
Locomotives
Shuttle Cars

Mine Conveyors
Loaders — Jigs
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KENNAMETAL BITS

- **Last Longer**
- **Cut Faster**
- **Save Power**

Kennametal Style U-1 Mining Machine Bit, one of the 12 styles for use with standard chains.

Longer Bit Wear!

For example: Kennametal bits reduce number of bit changes in the ratio of:

- 42 to 1 — Alma Seam, W. Va.
- 44 to 1 — Pittsburgh Seam, Penna.
- 30 to 1 — #9 Seam, Kentucky

Faster Cutting!

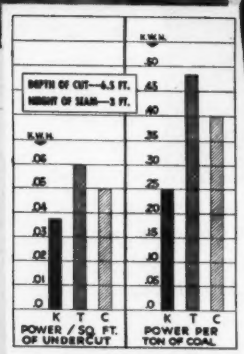
For example: Kennametal Bits reduce cutting time, per place:

- 44% — #6 Seam, Ohio
- 28% — Pittsburgh Seam, Penna.
- 37% — Thacker Seam, W. Va.

Less Power!

For example: Kennametal Bits reduce power consumption:

- 31% — Pittsburgh Seam, Penna.
- 40% — #2 Gas Seam, W. Va.
- 51% — Pittsburgh Seam, W. Va.



Tested on the above Esterline Angus Watt-Hour Meter Kennametal U-8 bits (K) reduced power consumption 43% as compared to (T) Throw-Away bits, and (C) Conventional bits.

Cut 100 Places

Actual photograph of a Kennametal U-8 bit, typical of a complete set that cut 100 places in the Winifrede Seam in West Virginia before it was sharpened. Obviously the bits will cut several hundred more places. In the same seam conventional bits cut one place per change.

Kennametal Mining Machine Bits help you increase tonnage because they cut faster, and stay sharp up to 100 times longer than conventional bits. Machines require less power, and repairs are materially reduced. Kennametal Bits consistently outperform other bits because their cutting edges are solid Kennametal, the amazingly durable cemented carbide that boasts diamond-like hardness, and has high resistance to shock, abrasion and wear. Many mine operators report that Kennametal bit cost is ⅓ to ½ lower.

Find out how Kennametal Mining Machine Bits can increase tonnage and lower bit costs for *you*. A Kennametal Sales-Service Engineer will be glad to give you a demonstration.

MINING DIVISION

KENNAMETAL® *Inc.*

Latrobe, Pa.

The World's Largest Manufacturer of Cemented Carbide Mining Tools

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Mining CONGRESS JOURNAL

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Contents

VOLUME 34, NUMBER 12 FOR DECEMBER, 1948

Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

THE AMERICAN MINING CONGRESS
1102 RING BLDG., WASHINGTON 6, D. C.

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Published Monthly. **Yearly subscriptions, United States, Canada, Central and South America, $3.00. Foreign, $5.00. Single copies, $0.30. February Annual Review Issue, $1.00. Entered as Second-class Matter, January 30, 1915, at the Post Office at Washington, D. C.**

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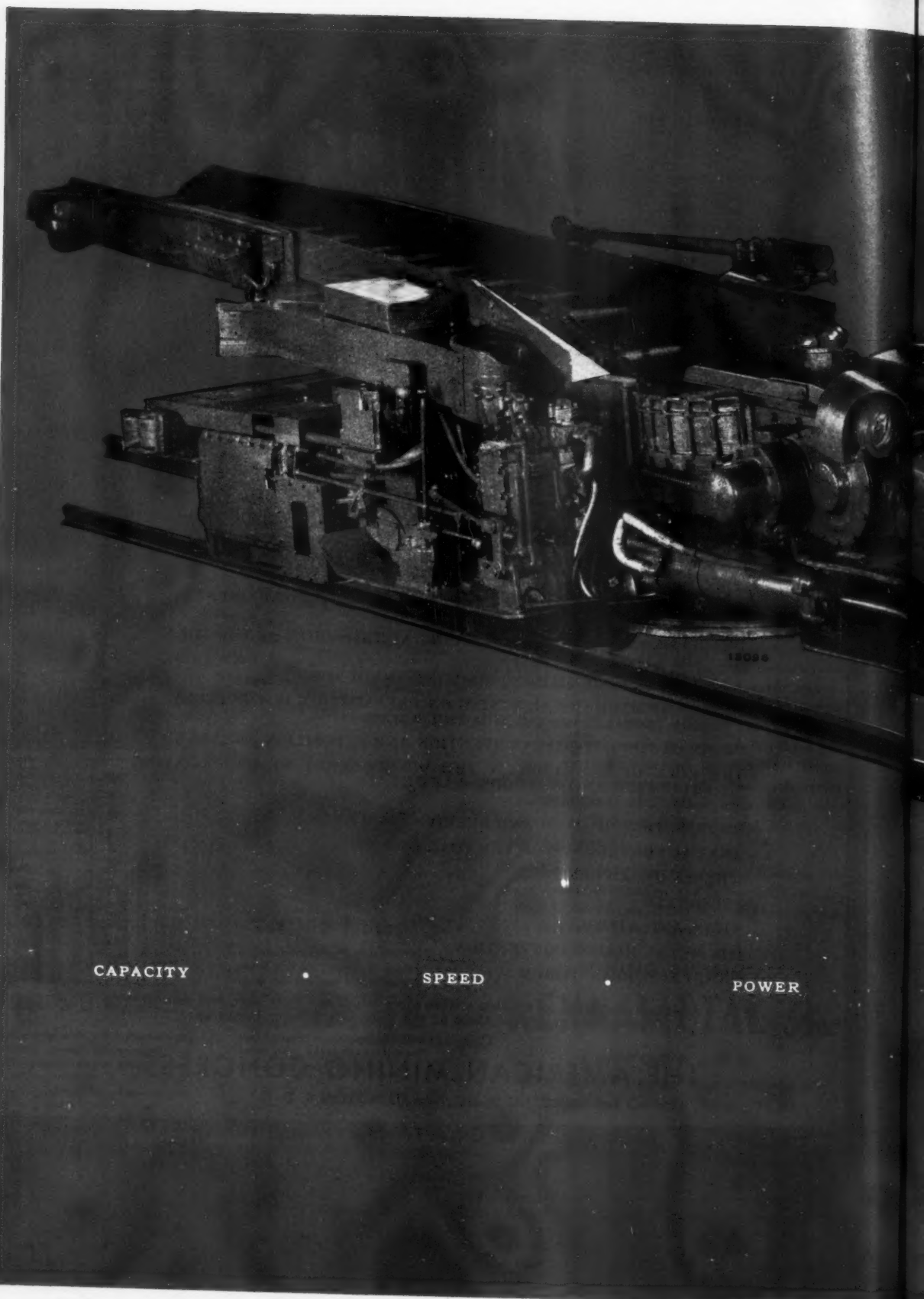

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"I can't keep up with these new A.C.F. mine cars. *No* mule could stand the pace they set. Shift after shift, month after month, they *never* seem to wear out! They don't even stop to unload—just dump on the move—then back down the slope again. They've made me nothin' but a has-been, as far as modern coal mining is concerned!"

Call on your nearby A.C.F. Sales Representative for help on your transportation problems. American Car and Foundry Company
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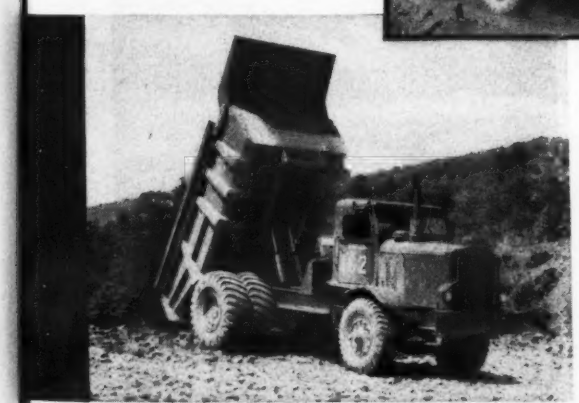
a.C.f. MINE CARS

for Greater Coal Output

(Above) Model TD Rear-Dump Euclid. 22 ton capacity . . . 14.8 cu. yds. struck measure . . . loaded top speed 31.2 m.p.h. . . . powered by 225 or 275 h.p. diesel engine.

(Below) Double-acting twin hoists and entire hydraulic system are of Euclid design and manufacture. Action is fast and positive enabling operator to control body position at all times.



REAR-DUMP EUCLIDS are engineered and built for lasting strength. Their ability to stay on the job, day after day, means more tons moved at lower cost . . . "plus" performance for owners.

Model TD Euclid body has extra thick plates reinforced with heavy box section side and bottom supports. The rugged frame is built to stand the jolts of hauling 22-ton loads. That's why it can take the pounding and wear of loading ore, coal, overburden, and heavy excavation by large shovels and draglines.

Some other "plus" features that make the Model TD Euclid unequalled for long-life and continuous performance are large capacity . . . ample power and traction for steep grades and tough roads . . . good speed on the haul road and full-floating, double reduction planetary type Euclid axle.

If you want economical operation and equipment best suited to your hauling needs, see your Euclid distributor or representative.

The EUCLID ROAD MACHINERY Co. Cleveland 17, Ohio

Exide IRONCLAD BATTERIES

HAVE ALL FOUR VITAL CHARACTERISTICS FOR SAFE, DEPENDABLE MINE HAULAGE SERVICE

1. **HIGH POWER ABILITY** . . . abundant reserve power plus an ability to discharge at high rates.
2. **HIGH ELECTRICAL EFFICIENCY** . . . hence low power costs.
3. **RUGGEDNESS** . . . to withstand hard usage.
4. **LONG LIFE *and* MINIMUM MAINTENANCE** . . . which add up to better service at a saving.

Because of these outstanding qualities, Exide-Ironclad Batteries are used by more mine operators than all other batteries combined.

Most batteries look much alike on the surface. But inside are the differences that determine power, performance and battery life. One notable difference in Exide-Ironclad construction is the positive plate.

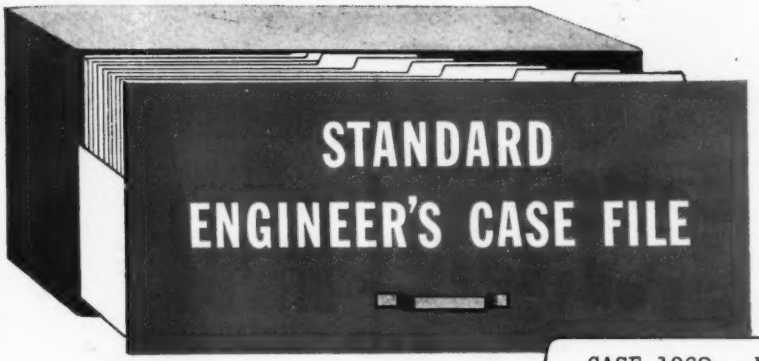
THE POSITIVE PLATE consists of a series of slotted tubes which contain the active material (see small illustration at left). So fine are these slots that, while permitting easy access of electrolyte, they retard active material from readily washing out . . . thus assuring years of safe, dependable, day in and day out mine haulage service.

1888—Dependable Batteries for 60 Years—1948

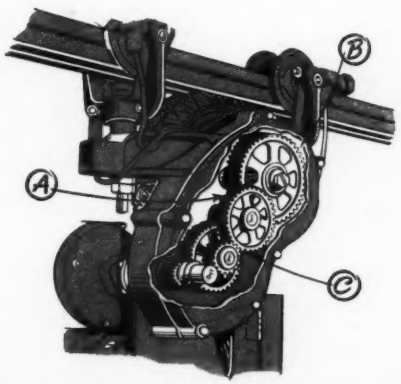
If you have a special battery problem, or wish more detailed information, write:

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 32

Exide Batteries of Canada, Limited, Toronto



CASE 1062 -- MAINTAINING LUBE FILM ON HEAVY-DUTY GEARS.



HOIST GEAR UNIT FOR OVERHEAD CRANE

Viscous and tacky Calol Vistac Oils stuck tight under extreme pressures on hoist gears. Efficient for all heavy-duty gears, like industrial reduction sets. Come in six grades, 9X (SAE 10) to 45X (SAE 40). Apply by forced-feed or gravity lubricators, bottle- or wick-oilers.

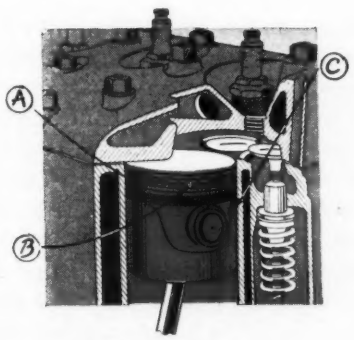
A. Contain oiliness and extreme-pressure compounds. Tough film won't rupture, even on slow-moving gears with extreme pressures on wide area for long time.

B. Economical - little required to provide adequate lubrication and dissipate heat. Resist highest operating temperatures.

C. High affinity for metal maintains lubricating film, reduces power loss and wear.

Calol Vistac Oils also recommended for lubrication of air hammers, rock drills and other air-powered tools ... atomize quickly and stay fluid at low temperatures.

CASE 1017--REDUCING OVER-HAULS IN GASOLINE ENGINES.



SECTION OF GASOLINE ENGINE

When gasoline engines were lubricated with compounded RPM Motor Oil, pistons, cylinders, valve stems and other oil-contacted parts remained clear of carbon, gum and lacquer. Wear was minimized and rusting was not a problem. Recommended for gasoline engines. Five grades: SAE 10/10W to SAE 50.

A. Contains detergent which loosens and removes carbonaceous matter, keeps it dispersed in the oil so it is removed with drainings. Assures free-working rings, valves and other parts.

B. Sticks to hot spots - reduces usual wear on upper cylinders and pistons.

C. Adherence to cylinders when engine is idle minimizes starting wear and prevents rusting - moisture will not cut through oil film.

Other compounds in RPM Motor Oil resist oxidation, prevent corrosion of bearings, and stop foaming.

For additional information and the name of your nearest Distributor, write

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17th and Stout Streets, Denver 1, Colo.

Standard Oil Company of Texas
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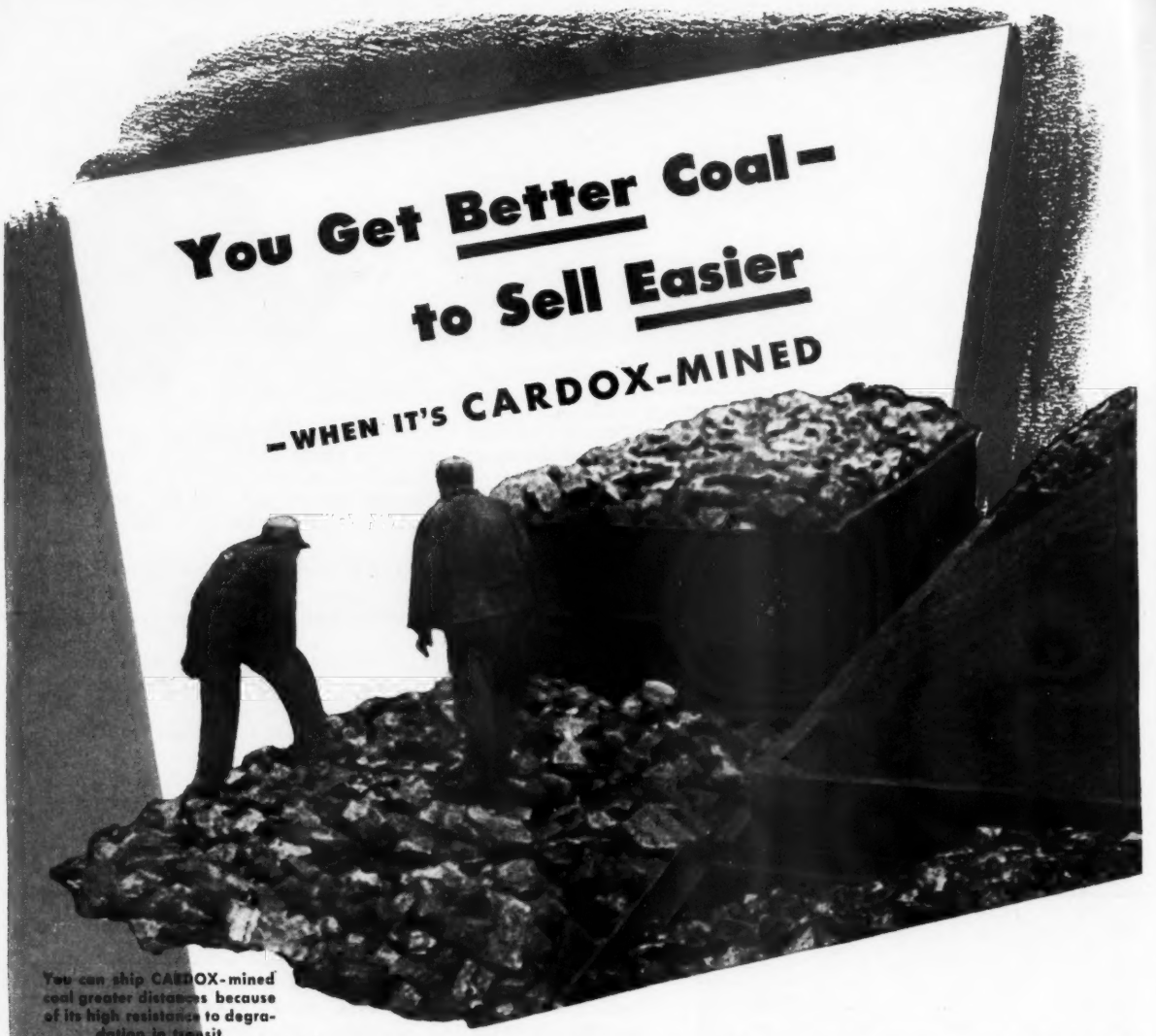


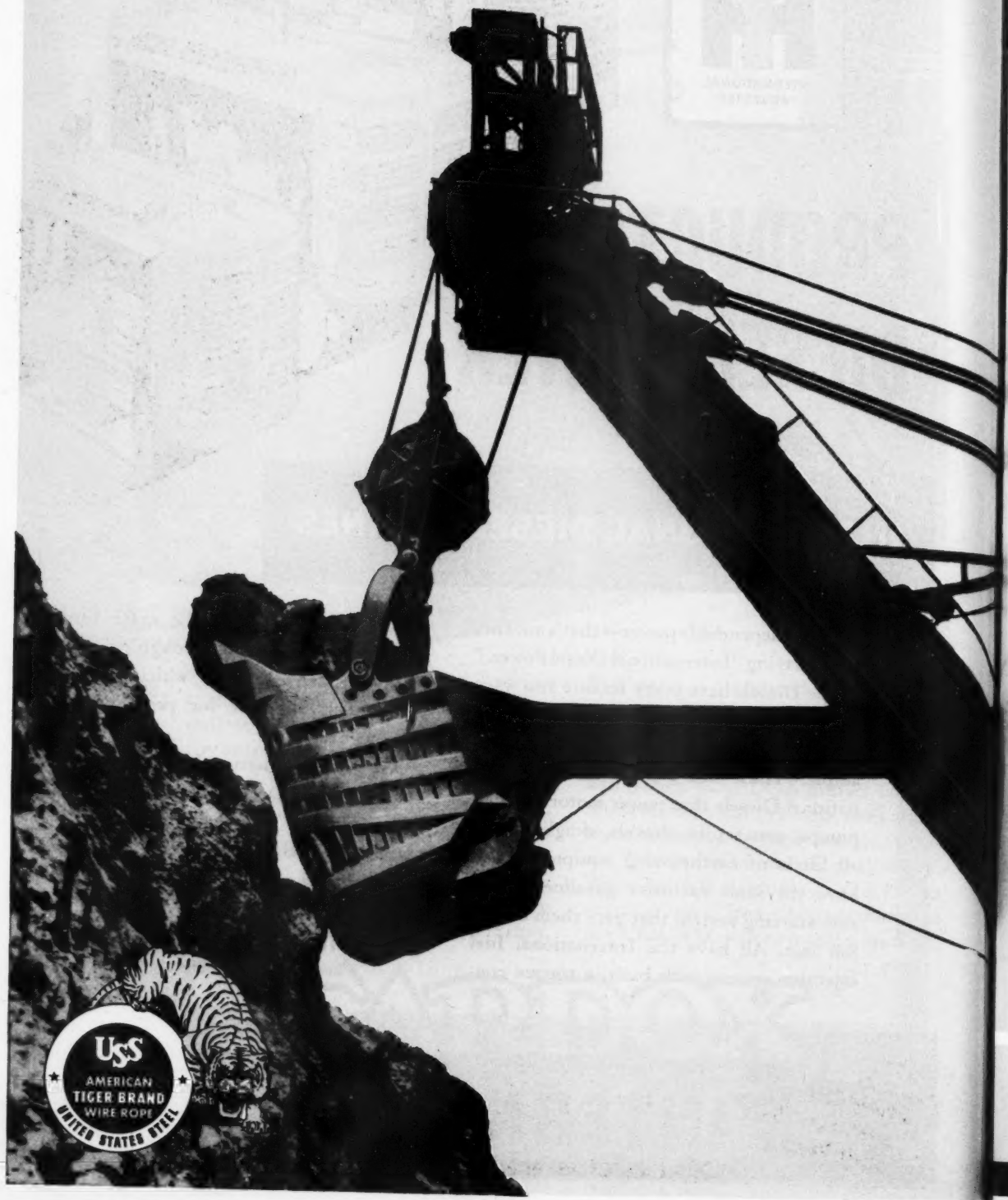
You can ship CARDOX-mined coal greater distances because of its high resistance to degradation in transit.

Build business on the sound basis of customer satisfaction. Hold your present outlets—and establish new accounts—by shipping coal that resists degradation. CARDOX replaces explosives as a coal-dislodging force. The gentle, heaving action of CARDOX breaks coal down into firm, solid lumps. The coal is free from shatter cracks that cause degradation at every step in preparation and handling.

The result is improved quality—coal with improved heating efficiency that retains its premium-size through long shipments and rough handling in storage yards. CARDOX-mined coal is more economical to clean. Less small sizes and screenings please your dealers. You profit by greater realization. Write for full details . . . and let us arrange for a free demonstration of the CARDOX *safety* mining method.

CARDOX

How the proper application



# of wire rope

-may save you money

● Every user wants to get the best possible service out of his wire rope but it is amazing how often simple rules are broken in the field. Some operators are careless when installing a new rope . . . they keep machines running when sheaves are badly worn . . . they overload the rope . . . they forget to lubricate the rope.

To help eliminate these human failings, the American Steel & Wire Company maintains a staff of TIGER BRAND Wire Rope Specialists. These men are experienced field service engineers. If you have not checked your equipment recently, for correct wire rope application, call in the TIGER BRAND Specialist. He'll do the job for you without charge. Here are some of the points he checks before recommending the proper wire rope for your job—

1. Method of installing and caring for rope.
2. Diameter of sheaves and drums, and condition of grooves.
3. Arrangement of sheaves.
4. Fleet angles.
5. Loads handled.
6. Rope speeds, acceleration and deceleration.
7. Presence of vibration, whipping.
8. Lubrication.
9. Corrosion.
10. Amount of scrubbing and abrasion.
11. Fitting attachments.
12. Abuses to be corrected.
13. Analysis of service records.
14. Finally: Recommendation of the correct rope to meet all conditions.

To show you how you can save money on wire rope, we have prepared a booklet on proper wire rope application that every user of wire rope should read. You can get a copy by mailing the coupon.

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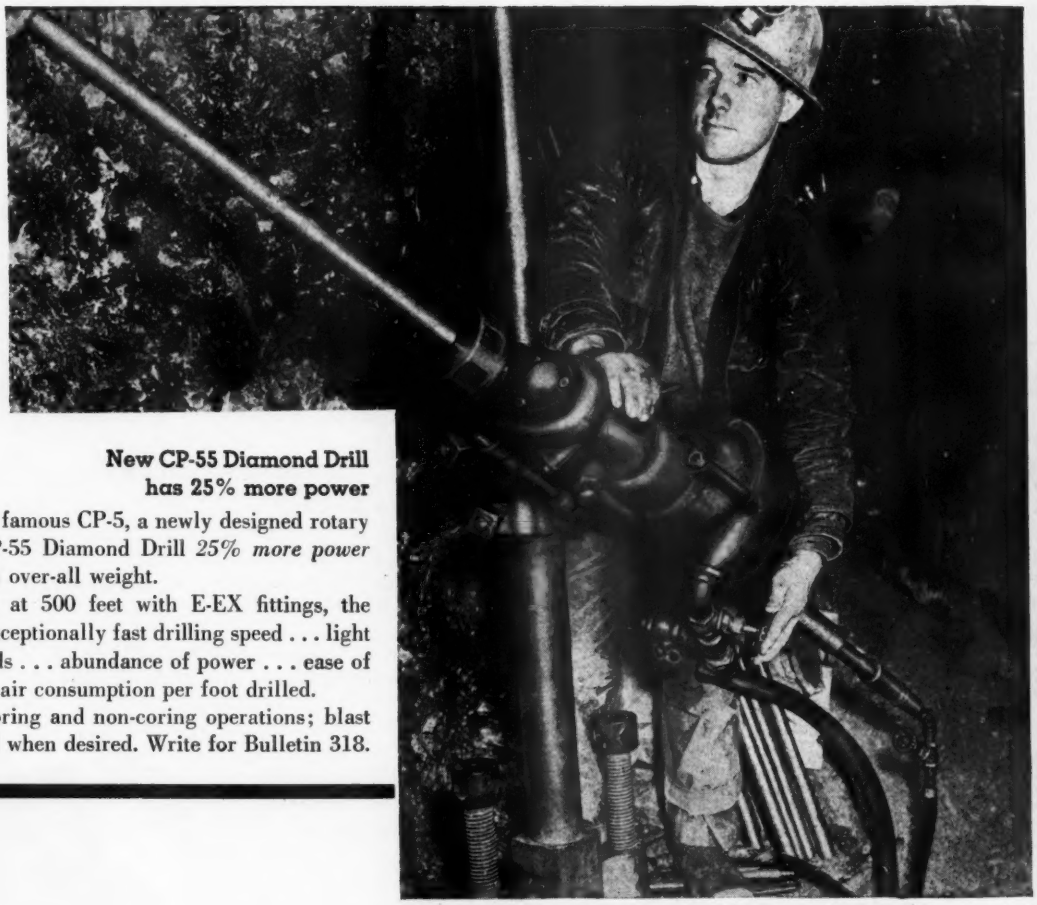


New CP-55 Diamond Drill has 25% more power

Basically similar to the famous CP-5, a newly designed rotary air motor gives the CP-55 Diamond Drill *25% more power* without any increase in over-all weight.

Conservatively rated at 500 feet with E-EX fittings, the CP-55 is notable for: exceptionally fast drilling speed . . . light weight; only 160 pounds . . . abundance of power . . . ease of handling . . . minimum air consumption per foot drilled.

Designed for both coring and non-coring operations; blast hole couplings supplied when desired. Write for Bulletin 318.

Complete line of Sinker Drills

Chicago Pneumatic builds a complete line of Sinker Drills, for dry or wet drilling, ranging from the conveniently light CP-22 (28-pound) and the general utility CP-32 (45-pound) to the heavy-duty CP-60N (119-pound).

The CP-42 (55-pound), illustrated in action, is especially suited for shaft sinking and other heavy work in hard formations. Its powerful air blow keeps even the deeper holes free from cuttings. With fast drilling speed and strong rotation, it also is outstanding for low air consumption per inch drilled. Write for Bulletin 850.

Modern Mining

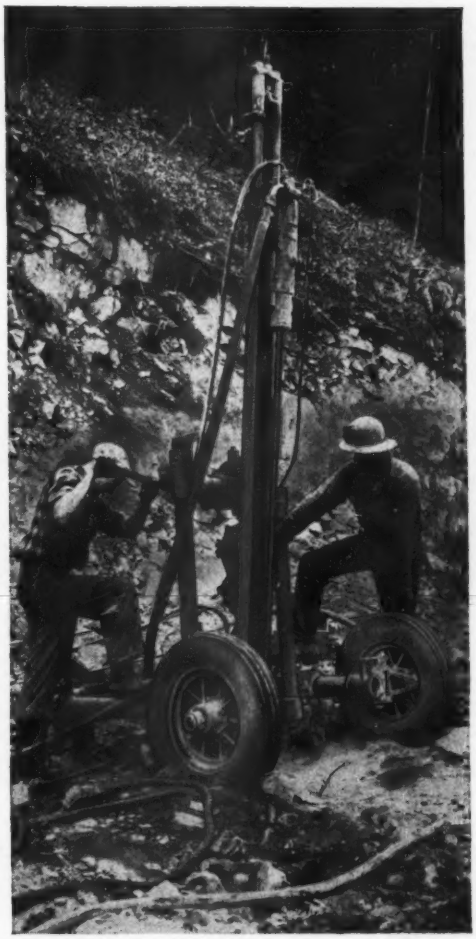
Mining Congress Exposition

CP ROTORdrifter has most efficient feed

The new CP ROTORdrifter — with a rotary motor built into the drill — offers these important advantages: shorter overall length . . . less weight . . . a single air hose . . . drill and feed controls both located in backhead . . . exceptional drill balance . . . smooth operation, with lessened vibration . . . minimum number of working parts . . . low upkeep. Two sizes: CP-50N of 3″ cylinder bore; CP-60N of 3½″ cylinder bore. Write for SP-2026.

For every demolition job

The new 35-pound CP-113, illustrated, completes the world's largest line of demolition equipment—ranging from the lightweight CP-111 (25-pound) to the powerful CP-118 (80-pound) for the heaviest kind of jobs. Request Bulletin 865.



For fast, easy drilling

Designed to provide fast and easy operation of the more powerful CP drifter drills, the lightweight G-200R Wagon Drill reduces drilling costs . . . drills holes at any angle . . . is easily moved over uneven ground. Available with CP-50N (3″), CP-60N (3½″), or CP-70 (4″) Drifters. Write for SP-1980.

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The Governor of Nevada *invites You*

STATE OF NEVADA
EXECUTIVE CHAMBER
CARSON CITY

VAIL PITTMAN
GOVERNOR

To American Industry:

With the rapid increase in population of the United States, combined with the decentralization of industry and the westward movement, Nevada is destined for great industrial expansion in the near future. Contributing factors are:

1. Cheap hydro-electric energy
2. Raw materials, with emphasis on livestock and minerals (metallic and non-metallic)
3. Other natural resources
4. Favorable labor conditions because of friendly relationships between industry, management and labor
5. Ideal climate and exceptionally favorable working conditions
6. Nevada's tax structure:
   - No Inheritance Tax
   - No Income Tax
   - No Sales Tax
   - No Tax on Intangibles
7. Unsurpassed transportation facilities and close proximity to water transportation.

I respectfully suggest that you investigate the opportunities and advantages Nevada offers industry for investment and expansion.

Cordially yours,

Governor

Vail Pittman

* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

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Omaha 2, Nebraska

UNION PACIFIC RAILROAD

Road of the Daily Streamliners

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FREE

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Opportunity

FOR YOU...

- to keep well-informed on the best ways to construct and maintain mine power circuits!
- to read interesting articles on modern mining methods as practiced by other companies!
- to know how properly-designed materials can help you to produce more tonnage—and at lower cost!
- to have complete engineering data on new O-B products as they are released!

Prepared especially for you, Haulage Ways is a monthly publication devoted almost entirely to mine transportation and power problems. If you are charged with the responsibility of ordering, specifying or installing trolley line and feeder materials, rail bonds, car couplers, motor starters, distribution boxes and similar materials, ask to be placed on the Haulage Ways mailing list. We will be glad to send you your own personal copy, free every month. Simply fill out and mail the coupon today.

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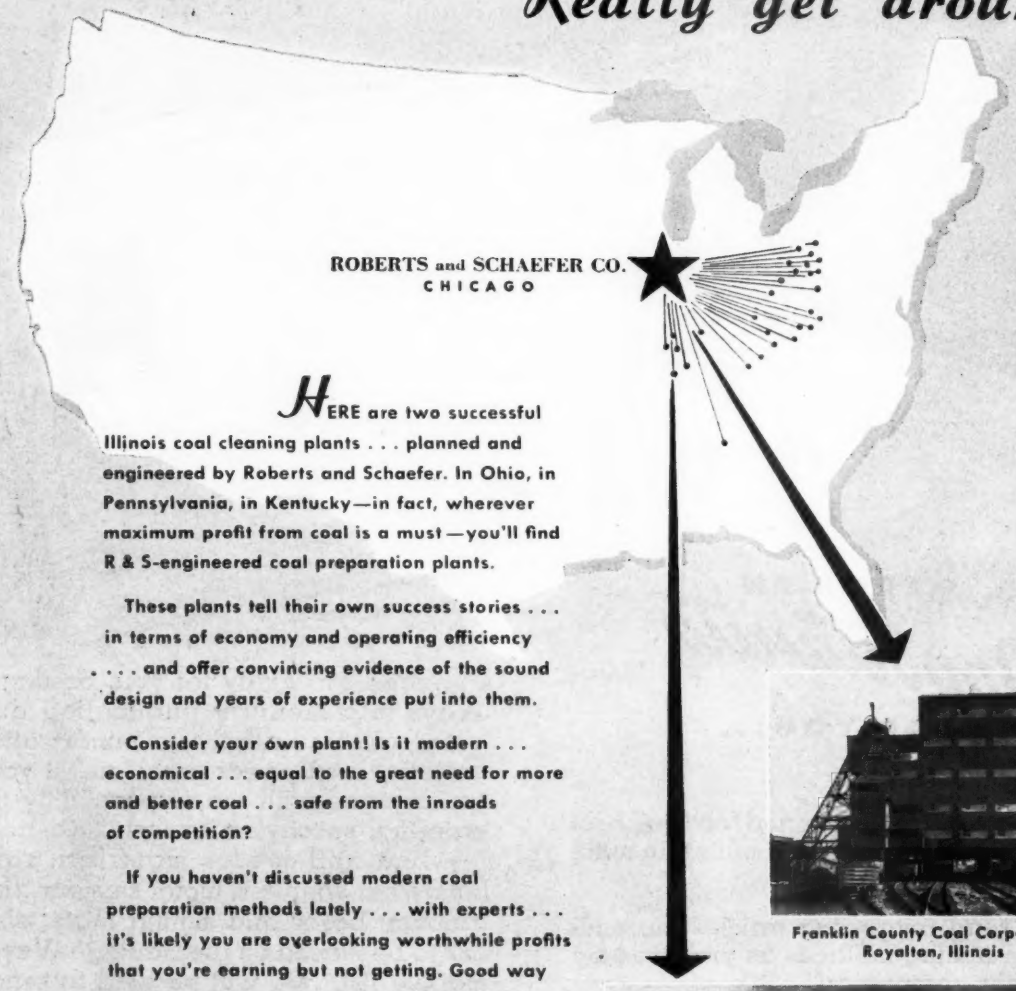

HERE are two successful Illinois coal cleaning plants . . . planned and engineered by Roberts and Schaefer. In Ohio, in Pennsylvania, in Kentucky—in fact, wherever maximum profit from coal is a must—you'll find R & S-engineered coal preparation plants.

These plants tell their own success stories . . . in terms of economy and operating efficiency . . . . and offer convincing evidence of the sound design and years of experience put into them.

Consider your own plant! Is it modern . . . economical . . . equal to the great need for more and better coal . . . safe from the inroads of competition?

If you haven't discussed modern coal preparation methods lately . . . with experts . . . it's likely you are overlooking worthwhile profits that you're earning but not getting. Good way to find out is to consult Roberts and Schaefer . . . without obligation.

Franklin County Coal Corporation
Royalton, Illinois

The Freeman Coal Mining Corporation
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For washing coarse coal R & S HYDRO-SEPARATOR Bulletin No. 171

For washing fine coal R & S HYDROTATOR Bulletin No. 166

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CONGRESS JOURNAL
Published for the Entire Mining Industry
by the AMERICAN MINING CONGRESS
SHELDON P. WIMPFEN, *Editor*

VOLUME 34 DECEMBER, 1948 NUMBER 12

Hazards to Progress

ONCE it was possible to successfully predict the economic climate for at least one or more years ahead. Now within a few decades men have seen successive waves of inflation, depression, and inflation. Administration changes in the government cause business to proceed with great caution and sniffing of the political-economic winds before acting. But, relatively, this country is the safest place in which to make limited provisions for the future. There are, however, serious threats to this situation that are imposed both from within and without the country's borders.

Tax imposition alone, exacted by a government embarked on a spree of more and more spending, could wipe out businesses operating on a narrow margin of profit. Already taxes on mining enterprises approach virtual confiscation as they tend to discourage new ventures and prohibit provident accumulation of funds with which to undertake them.

Inflation, reflecting the inability of the state to pay its way on taxes and revenue from the sale of bonds, can at a single jump turn a likely prospect into a poor risk. The levy of inflation, made without justice or any regard for the victim's ability to pay, appears on the scene in time of war. When the money presses are speeded up and the paper produced is not redeemable, the resulting inflation depreciates and destroys the capital essential for making new mines.

Fluctuating business cycles changing in tempo from feverish boom to dull depression are little understood, although we have learned more about them in the past 20 years. Variations in the line of protective tariffs offers further future imponderables to those who seek to produce minerals.

Externally the forces of communism and socialism press at our door. Trickles of these vicious concepts even now are gumming up important branches of our economy.

Similarly, these perils affect every phase of industry. If we intend to maintain our industrial and economic strength, every possible step must be taken to eliminate or reduce to a minimum these threats to progress.

High Time for Action

COSTLY strikes called by the International Union of Mine, Mill, and Smelter Workers are seriously curtailing sorely needed metal production. These strikes center on the insistency by mine management that non-Communist affidavits be executed by union officials before contract negotiations are undertaken. These work stoppages have put hundreds of miners in severe financial straits.

Rank and file IUMMSW members suffering from these costly, illegal, and disloyal strikes should immediately grasp the reason why thousands of their members in many locals have repudiated this International union and have seceded. They should realize that Philip Murray's CIO investigation committee reported publicly that IUMMSW officials were continuously dealing with representatives of the Communist Party in shaping the policy of the International union. They should know that Willard Morris, counsel for the No. 2 District in Utah refused to serve further, declaring that the union had become the "helpless captive of an odorous foreign ideology, the Communist Party."

Long-suffering rank and file members should immediately demand of their top officials that they comply with the law or GET OUT.

Flight to Fluids

RECURRENT strikes since 1941 have aggregated a lost coal tonnage of nearly 300,000,000 tons. During some strikes steel production was curtailed; electrical power supply reduced, and railroad service cut.

More far-reaching effects take place in the aftermath of perennial coal strikes. Consider the prolonged strike in the anthracite field in 1925-26, weathered by utilizing all existing stocks, reducing exports, and employing substitutes. Newly-mined anthracite, 75,000,000 tons in 1924, fell to 52,000,000 tons in 1925. Since rising to 71,000,000 tons in 1926, production declined as consumers converted to other fuels.

Today, the use of fluid fuels is expanding. Since 1941, Class I American railroads have increased purchases of Diesel fuel tenfold. In 1941 oil-burner sales for domestic heating totaled 266,935 units. Sales fell during the war, then rose to 829,470 units in 1947. Coal-stoker sales were 39,275 and gas-heating unit sales were 68,615 in 1947.

Another aspect of the current picture is the present high of 52 days' supply of coal for average industrial use. Even during the peak production of the war years, coal stocks seldom exceeded 38 days' supply.

Clearly, the coal industry is feeling the effects of increased competition of other energy sources encouraged by coal's "strike at the drop of a hat" policy. For the coal industry to maintain its preeminent position, the consumer should be freed from the feeling of uncertainty that strikes provoke.

With the sheave wheels placed, the collar sets and hoist installed, San Manuel's first deep shaft is being sunk

Exploration and Development of the San Manuel Ore Body

By WESLEY P. GOSS
General Manager
Magma Copper Co.

Churn Drilling Disclosed Extensive Copper Ore Body Minable by Block Caving

ABOUT 45 miles north of Tucson, Ariz., is the Old Hat mining district where the San Manuel property is located. The town of Mammoth, about three miles further north, is one of the oldest towns in Arizona and has been the center of mining activity off and on for over 75 years. The old stage road from Tucson to Globe, as well as the present State Highway 77, crosses the property over the ore body.

A prominent hill of monzonite, stained red with iron oxide, attracted early prospectors to the property but shallow prospecting and two churn drill holes put down in 1915 failed to discover anything of economic interest. Most of the area surrounding the red hill is covered with a layer of conglomerate. Two small outcrops of copper silicate stained monzonite lie at the base of the hill. The largest of these outcrops covers less than two acres in a triangular shaped patch.

J. M. Douglas, R. B. Giffin, V. Erickson, and H. W. Nichols were owners of a group of claims covering part of the San Manuel property. In 1942 they applied to the RFC for a development loan and the USGS was requested to examine the property, which they did. The Survey recommended that the US Bureau of Mines test the ground and early in 1943 the Bureau decided to put down some churn-drill holes in the outcrop and through the surrounding conglomerate to determine the value and extent of the copper mineralization. Dr. B. S. Butler of the USGS, then head of the Department of Geology at the University of Arizona, was instrumental in convincing the Bureau that an important and valuable body of copper ore might exist under the conglomerate cover.

The USGS mapped the area and the Bureau of Mines drilled a few shallow holes, starting in November, 1943. A coordinate grid system was laid out on 200-ft centers to conform to the estimated axis of the ore body. The preliminary drilling showed that the ore body did extend under the con-

glomerate and that it continued in depth beyond 350 ft, which was the deepest hole drilled. The Bureau secured additional funds and continued drilling.

The Magma Copper Co. became interested in the property and upon the recommendation of Dr. John Gustafson, who was engaged in geological work for the Magma Copper Co. at the time, Magma secured an option to purchase the property in August, 1944. Magma also took options on some adjacent claims and located other claims on surrounding open ground. In September, 1945, Magma exercised its option and formed the San Manuel Copper Corp. to carry on exploration and development of the property.

At San Manuel, greatest of the recent major copper discoveries, 460,000,000 tons of ore of 0.7-0.9 percent grade have been churn drilled. Mr. Goss, who has been directing San Manuel activities, describes here the drilling and sampling program which defined, in part, this huge ore body. Shaft sinking is under way and the proposed methods of finding required information on which to base the mining method and mill design are outlined.

Churn Drilling Proves Most Effective

The Bureau of Mines engineers decided before they started exploration that churn drilling was the most practical method of obtaining samples in this area. They did not think diamond drills would core unless a large diameter core such as 3 in. or more was cut. This would have been expensive sampling. When Magma took over the property the company engineers agreed with the Bureau that diamond drilling was impractical, so churn drilling was continued. Later on a neighboring company, drilling in search of an extension of the ore body, introduced diamond drills. Observations of their drilling was convincing proof that churn drilling was better suited for sampling this particular formation. Core samples would have been desirable to have so an attempt was made to cut them with a rotary rig. It was a good rig and was operated by an efficient crew. The hole was put down 1000 ft before coring was started. The hole was continued to 1650 ft with core-cutting bits but less than ten percent core was recovered. The hole was 9 in. in diameter and the core 3⅝ in. in diameter. The ore is interlaced with numerous fractures in all directions. The core broke on these fracture planes while in the core barrel and was ground to powder. After this no further attempts were made to obtain a core.

Drilling started in the shallower part of the ore body where only a few holes were drilled deeper than 1500 ft. Most of these holes were collared with an 8-in. bit and finished with a 6-in. bit. Both the conglomerate and the monzonite proved to be tight, compact rock so that casing was seldom needed. When drilling was extended over an area where the overburden and ore was deeper only a few holes were less than 2000 ft and several were over 2700 ft with the deepest 2850 ft. These deeper holes were started with 12½-in. diam bits and casing was generally necessary. Most of the casing was recovered for reuse and the loss did not average quite ten percent.

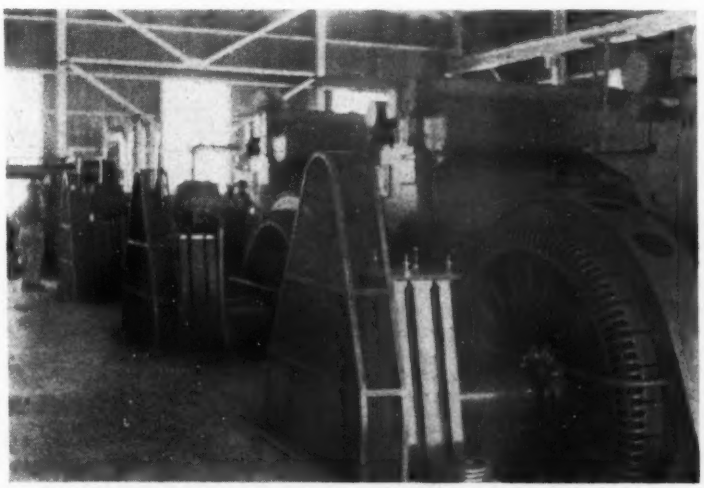
Varied Equipment Used in Drilling

No attempt was made to specify the type of drilling rig or equipment to be used. Contractors brought in whatever machine they had suitable for the job. Six different models of Bucyrus-Erie machines were used at various times. The Bucyrus 36-L and the latest model Bucyrus 28-L were the most satisfactory rigs tried, especially on holes over 1500 ft deep. Four different models of Fort Worth spudders were also used; they were the Super D, Model F, Jumbo H, and Super J. The Fort Worth machines did well on deep holes but they were heavy and cumbersome to move, took more time than the Bucyrus machines to set up, and required a larger site on which to work. Gasoline, Diesel oil, and butane were used as fuel, depending on the engine. The water table lay from 300 to 700 ft below the surface so the contractors had to haul the water needed for drilling until they had reached the ground water. They used tank trucks and obtained the water from the Mammoth-St. Anthony mine, about a mile from the drilling area.

The coordinate system for drilling started by the Bureau of Mines was adopted and extended. At first holes were drilled on centers 200 ft apart along the supposed strike or long axis and on 400-ft centers across the short axis. As the body began to take shape and its area was realized, to some extent, holes were drilled on 400-ft centers in both directions. The Bureau of Mines drilled 17 holes having a total of 15,844 ft; San Manuel deepened several of these holes and put down 88 new holes drilling 180,092 ft in total.

Assays Outlined Vertical Ore Limits

Samples were taken every 20 ft while drilling in conglomerate except where copper minerals were visible in the sludge and then five-foot samples were taken every five feet until the hole was finished. Drilling was continued in each hole for a considerable distance, in material assaying less than 0.4 percent copper, below the projected bottom of the ore body, before the hole was abandoned. Where the information from adjacent holes permitted a reasonable estimate of the depth to the bottom of the ore holes



Three gas Diesels in a modern plant provide a total of 3000 kw

were seldom drilled over 120 ft in low grade below the estimated bottom position. Where there was some doubt as to the thickness of the ore body the holes were drilled up to 500 ft in low grade material below the last assay of 0.5 percent or better.

Samples were taken every five feet from the bottom of the conglomerate to the bottom of the hole. After a five-foot run the operator was required to bail the hole until it was clean. All of the material bailed was run through a series of splitters and the cut taken for sampling was drawn off in a five-gallon milk can. A portion of the reject was taken from each run to provide material for classifying the rock and for panning a concentrate.

Shown here before completion, the headframe at San Manuel may, within a few years, be hoisting 15,000 tons of ore daily

The entire contents of the milk can containing 15 to 20 lb of solids were dried on a steam table. All of the water was evaporated and no attempt was made to settle and decant before drying. After drying the sample was quartered and one of the quarters was pulverized for assay pulps. The three quarters were bagged separately and stored for future reference. Each sample representing five feet of hole was assayed separately. When a hole was completed composite samples, representing about 100 ft of drilling, were made up covering the entire ore column in each hole. These composites were assayed in the company laboratory and spot checks made with assays run by outside custom assayers. Finally a composite was made for the total sulphide column in each hole and each of these composites was assayed by the company and an independent custom assayer. The average of the five-foot samples checked with the composite samples within a few hundredths of one percent copper.

One of the characteristics of the San Manuel ore body is the uniform distribution of copper values throughout the body in both horizontal and vertical direction. The percentage of copper in each ore column cut by the large majority of holes is close to the percentage of copper in the entire ore body. In an individual hole the top of the ore body is usually marked by a change in copper content from 0.3 percent or less to 0.8 percent copper in a single five-foot run. The succeeding samples would seldom assay over 0.9 percent or below 0.7 percent copper until the bottom was reached. The bottom would be marked by an immediate drop from 0.8 percent copper to say 0.4 percent in the next sample and within a few more runs the assays would be below 0.3 percent copper. Below this it was not unusual to have several hundred feet of 0.25 percent copper before the grade fell to 0.1 percent or less. In general the footwall material was pyritic with chalcopyrite giving way to pyrite and with little change in the total sulphide content.

The size, shape, and extent of the ore body was established by systematic drilling. From the beginning numerous theories were advanced regarding the trend and location of the values beyond completed holes. Little weight was given to these theories in practice for the ore was followed along the coordinate system as long as it persisted in a given direction. The full extent of the ore body is not yet known because, having developed 460,000,000 tons, drilling was stopped. A series of holes along the southwest perimeter of the drilling show good columns of ore. The best of these has a column 1780 ft thick averaging better than 0.7 percent copper; the bottom 500 ft of this column assayed 0.9 percent copper. It is not known how far the ore body extends beyond these holes.

For the greater part the ore body outlined is covered with several hundred feet of Gila conglomerate. Most of the tonnage is so far below the surface and covered with so much overburden that stripping and open-cut mining is out of the question. The structure of the monzonite observed on the surface and the experience obtained in drilling leads to the belief that the ore will cave readily and that block caving will prove to be the most economical method of mining.

Shaft Sinking Now in Progress

Drilling and sampling has provided proof of a definite tonnage of ore, the metal content thereof, and the partial boundaries of the ore body. Adequate representative samples are needed for metallurgical testing as a basis for the design of a reduction and concentration plant. Accurate knowledge of the physical characteristics of the rock in place and broken is needed in order to plan development and extraction methods and to estimate mining costs. To get this information a program of underground exploration has been started. Two shafts are being sunk—one 7 by 26½ ft outside of steel, with four compartments, will be 2140 ft deep and the other 7 by 20 ft outside of timber, with three compartments, will be 1960 ft deep. About 14,000 ft of drifting and crosscutting is planned on two levels.

A preliminary exploration program has been laid out so that the openings may be used for development or extraction when production is started. In order to obtain the desired information as quickly as possible it would have been better to locate the first shaft near the center of the ore body. If it had been thought that a conventional timbered shaft with three compartments four or five feet in cross section could be sunk 2000 ft deep near the center of the ore body that would have been the first shaft, even though it would eventually be lost.

It is anticipated that a large quantity of water will be encountered in the ore body. The St. Anthony Mining and Development Co., a few thousand feet north of San Manuel is pumping over 2000 gpm from their 1050-ft level. They pumped over 3000 gpm for many months after opening this level and the water came from a single 6 by 8 ft face. A comparable amount of water may develop in the San Manuel shaft and if this proves true a large shaft section will be necessary to accommodate the pumping equipment. In addition, expensive stationary pumps with sumps and accessory equipment will be required. It was not deemed wise to locate such

an expensive shaft in a position where it will be destroyed by mining operations. Consequently a site was chosen in the footwall of the ore body outside of the line of subsidence and about midway between the extremities of the body. Due consideration was given to faults, surface topography, and accessibility in choosing the site. The yard and surface plant has been arranged so that a twin shaft may be located close by. Two shafts will be needed to hoist the anticipated production of 25,000 to 30,000 tons per day. The first shaft has been started and is being sunk as a permanent shaft which will be capable of handling up to 15,000 tons of ore per day when provided with suitable skips and hoisting equipment. Steel sets, with concrete outside the steel where needed, will be used for lining.

A second shaft is being sunk in the ore body. This will be a timbered three-compartment shaft that will eventually be lost. If excessive water is not encountered development will soon be in ore and the needed information will be available. If the water is excessive this shaft will be delayed until the large footwall shaft is down and the ground around the second shaft dewatered. This second shaft is located in the part of the ore body which will probably be mined first. It will be used for access to exploratory levels in the immediate area and later will be used to service the development work required to prepare the body for extraction.

Surface Plant Progress

The surface plant required for the sinking and exploration program is rapidly nearing completion. Three General Electric 1000 kw generators driven by Cooper-Bessemer gas Diesel engines, and two Chicago Pneumatic air compressors; one of 1600 and one of 1800 cfm capacity have been installed in a modern power plant. Natural gas is supplied at 500-lb pressure through 20 miles of 4-in. pipe which was installed recently by the El Paso Natural Gas Co. to serve San Manuel. A machine shop, steel shop, hoist house, warehouse, change room, and office are either finished or nearly so. Twenty-one three-, four-, and five-room dwellings, two 24-bed dormitories, and a mess hall have been built.

Some months ago a topographic map of the area was prepared from Fairchild Aerial Survey photographs. Contour maps on a scale of 200 ft to the inch with 10-ft contour intervals cover the entire group of claims. These maps will provide the base for laying out plans for plant, townsite, transportation system, tailings disposal, and other surface construction. Current planning calls for production at a rate of 25,000 tons per day. A concentrating plant will be built as near to the ore body as property and topographic limitations will allow. It must of course be outside the ultimate limit of subsidence. A smelter may or may not be built depending upon economic conditions. There are already several copper smelters operating in Arizona, for instance the A. S. & R. Smelter at Hayden is 25 miles down the San Pedro river from San Manuel. Magma Copper Co. which controls San Manuel, has a smelter at Superior about 75 miles north of San Manuel. The transportation of concentrates plus the charge for smelting will have to be compared with the amortization of the cost of a new smelter plus the cost of smelting, before a decision is made.

Where the plant and townsite will be located has not been decided nor will it be decided for some time. About 1000 to 1200 men will be employed and, according to the experience in southwest mining camps, that will mean a new town of 5000-6000 population will come into being. During the next two years plans will be developed for the mine and permanent plant, but many details will have to wait until the information from underground is obtained.

The ore body is low grade and deeply situated; on the other hand the tonnage is large and the ore column is thick. San Manuel has a virgin, untouched deposit whose size, shape, and location have been accurately determined for the information of planning engineers. The best practices and most efficient devices developed in caving operations to date can be adopted. The combined and accumulated knowledge of many mines having years of experience will be drawn upon in laying out our plans for exploitation.

It is expected that caving blocks or

A fully-equipped weather station records data essential to planning surface facilities

No tar-paper mining camp this. All construction is soundly designed to provide for efficiency and comfort. Note air-conditioning units on mine office roof

panels 700 ft long, 160 ft wide and 600 ft high will be developed where the thickness of the ore will allow. Few blocks of this height have been caved and drawn before. The plans for development will be made flexible so that the height of the block can be reduced or increased if early experience indicates a change desirable. The opportunity is present for making this the most efficient block caving operation in existence.

Considerable thought has been given to the possibility of raising the ore to the surface by means of long, inclined conveyor belts in series, rather than by conventional vertical hoisting. This is quite practical from an engineering point of view. Modern conveyor-belt systems afford a cheap method of transportation. The inclined conveyor could be pointed in the direction of the surface plant and thus greatly reduce the length of surface transportation which will be required to reach the reduction plant if vertical hoisting is adopted. The decision on this point will of course be one of over-all economy and flexibility. Present conclusions consider that belt life would be too short and the consequent maintenance cost too high for a conveyor to compete with hoisting. However, great strides are being made by belt manufacturers for this type of service and before a commitment must be made the picture may change. In this connection the permanent footwall shaft now being sunk has been so designed that it can be used as an ore hoisting shaft or it can be used either as a supply shaft or as a ventilation shaft, both of which will eventually be required.

Adequate Pumping Provisions

The footwall shaft was located in an area unbroken by known faults and which a careful geological study indicated was the least likely to encounter a large flow of water while sinking. It is hoped this will prove to be true but provisions are being made for a disappointment. When the top of the ground water table is reached a pump station and sump will be cut on the 820-ft level. Two 700 gpm centrifugal pumps will be installed immediately and provision made for additional pumps if they are required. Sinking pumps with a combined capacity of 600 gpm have been provided and more may be installed if necessary. Air driven, large capacity, low-head sump pumps will be used in the bottom. They will discharge into a steel tank hanging in the shaft. Motor-driven centrifugal pumps will relay the water from this tank to the sump above. The platform holding the centrifugal pumps is under and an integral part of the hanging tank. When the head capacity of the hanging pumps has been reached booster pumps will be installed in series in the discharge pipe line. Two eight inch pump lines will be carried down the shaft.

Even though good fortune permits finishing sinking without encountering more water than can be easily handled, a large sump and pump station will be immediately installed on the bottom level before crosscutting the ore body. It is almost inevitable that a large flow of water will be encountered in the ore body so water doors will be installed and long holes will be carried ahead of the face of the crosscut towards the ore body.

The experience gained in bringing the San Manuel property into production will provide subjects for reports of deep interest and value to the mining industry. It is often said the geologist can make an accurate picture of the ore body after it has been mined out. The correct way to exploit the San Manuel ore body will be known after the ore is gone and the mistakes are history.

The early history of the San Manuel mine, the principal geologic features of the deposit, the methods of drilling and sampling, and some of the results of the drilling and sampling have been ably described in previous reports, namely Bureau of Mines Report of Investigations 4108; a paper entitled "San Manuel Prospect," by H. J. Steele and G. R. Rubly, given before the Arizona Section, AIME, at Tucson, Ariz., October, 1946; and a talk given by Philip Kraft at a meeting of the New York Section, AIME, in March, 1948.

Briton Comments on Carbide Bits

WRITING in the October, 1948, issue of the *Metal Powder Report*, publication of Powder Metallurgy, Ltd., London, England, D. H. Shute comments on the use of tungsten carbide for bits for percussion drilling. Mr. Shute remarks that "the history of the percussion bit tells always the same sad story of inconsistency, of phenomenal footages followed by complete failure . . . However, a more settled picture is emerging, as indeed it must—for after all, the carbide bit is merely going through the same vicissitudes which hindered developments in the early days of other carbide tools.

"Although apparently simple to make, the completely satisfactory carbide-tipped percussion bit has proved particularly troublesome to manufacture. While the problem, certainly insofar as Great Britain is concerned, may be considered as solved, it is significant that local conditions decide finally the value of a bit. German rock drills have not proved satisfactory on English granite, and the bit for English granite is not necessarily suitable for Witwatersrand Reef. This means that plants for the manufacture of bits, and eventually for the hard metal, will be built in the larger mining areas of the world.

"Powder metallurgy has so far contributed only the sintered carbide tip to rotary percussive rock drilling, the rest being a matter of tool making and mechanical engineering. From the results of recent tests, it is quite definite that powder metallurgy will play an even greater part in the manufacture of hard metal drills in the future. With the excellent mechanical properties now possible with steel powders . . . it is logical to make the entire drill from sintered metal. Just as the metal powder bits are replacing cast and mechanically set bits in diamond drilling, so the bit made completely by powder metallurgy is surely the answer in percussive drilling."

Safe Methods in the Anthracite Field

Efficient Organization Develops Safety Procedures to Protect Men and Equipment

By H. A. LEIDICH
Safety Engineer
Philadelphia & Reading Coal & Iron Co.

ACCIDENT prevention is considered a part of every man's job as much as production, therefore, it is a major operating problem. To prevent accidents and reduce costs requires mutual understanding and cooperation between officials and men, a lack of which is a common cause for many of the troubles within an organization.

Much has been written and said about education, training, better understanding, cooperation, etc., and one naturally asks the question—"How can best results be obtained?" The answer is by removing the mystery and frankly explaining to each employe just what makes the wheels go round. If each supervisor will put his problems squarely up to the men, usually they can and will help solve them, particularly if they are encouraged to think and given to understand that if ideas originate from them they will receive due credit. Safety work is never so successful as when ideas emanate originally from the men themselves.

Safety Organization

The safety organization at the Philadelphia & Reading Coal & Iron Co. is made up of five parts:—

(1) General Committee — general manager, chairman

(2) Division Committee—division superintendent, chairman

(3) Departmental Committee—superintendent, chairman

(4) Sectional Committee—foreman, Chairman

(5) Safety Inspection Department

All questions relating to safety, particularly those involving large expenditures, changes of methods, or any other problems which Division Committees are unable to decide are acted upon by the general manager. Meetings are held regularly at which problems relating to safety and production are discussed.

The division committee is composed of the colliery official staff and employes' representatives from various sections of the operation. This group meets monthly, usually at night, and one of the staff presents a problem of mutual interest that is discussed in open forum, resulting in valuable discussions. Following the educational part of the program refreshments are served, giving everybody a chance to become better acquainted and learn something about what the other fellow is doing.

The departmental committees meet monthly with the division superintendent as chairman. In his absence the colliery superintendent or someone appointed by him acts as chairman. This committee is composed of the colliery or breaker official staff. They decide on questions of safety which the sectional committees are unable to decide, also discuss unsafe practices, conditions, accident causes, and remedies.

The sectional safety committee, one to each section in the mine, is composed of section officials, the assistant foreman, fire boss, and all employes in the section. They meet once a week at the fire bosses' station, usually before starting time. The success of these meetings depends entirely upon the mental attitude and safety consciousness of the bosses and the active interest they are able to arouse in the men. At these meetings the workmen are encouraged to express their views on subjects relating to safety.

The safety inspection department consists of six safety inspectors and a safety engineer. Inspections are made daily and continuously while the mines are in operation. Inspectors usually travel with a section supervisor who has authority to correct unsafe practices or conditions immediately. Before an inspector leaves the colliery he reports verbally to the foreman and/or superintendent the conditions and practices that require immediate attention. Written reports are also sent daily to the division superintendent, colliery superintendent, and safety engineer. On each report are indicated items which should be brought to the attention of the general manager, who in turn requests a report from the division superintendent on corrective action. Only as we discover accident causes and bring them to light can we make progress in accident prevention.

The Locust Summit briquet plant, with raw coal storage yard

Daily Inspection Objectives

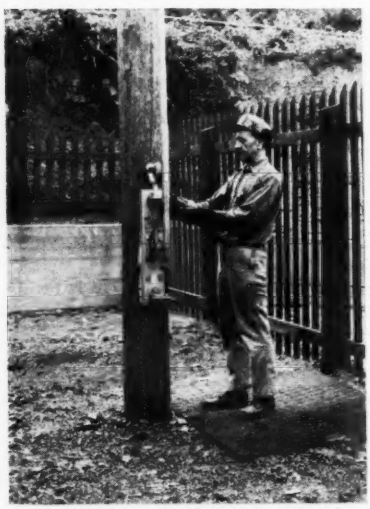
(1) To point out to supervisors dangerous conditions and practices not recognized by direct supervision or other employes

(2) To point out negligence or laxity on the part of supervision to safeguard employes against dangers previously observed

(3) To make practical recommendations for the information and guidance of supervision in safeguarding the health and lives of employes

(4) To give credit where credit is due for the exercise of all practical precautions on the part of supervision to safeguard employes

Inspection reports include observations of physical conditions, practices, equipment, mining methods, etc. with: conclusions as to what *could* be done to improve them; recommendations as to what *should* be done to improve them; and comments and constructive suggestions.



Transformer station, fully enclosed, with rubber-gloved operator standing on grounding mat

Accident Investigations

Inspectors investigate all accidents and written reports of all fatalities, and any other cases from which a lesson can be learned, are sent to the president, general manager, legal and compensation departments, superintendents, foremen and assistant foreman. The reports are read and discussed at sectional safety committee meetings so that all employes may profit from the experience. Each accident report should teach a new lesson. An accident report includes:

(1) General information regarding the injury and injured on a standard cover sheet

(2) Description of physical conditions including a sketch of the working place where accident occurred

(3) Description of activities preceding the occurrence of the accident. What persons were doing who were in any way involved in the accident

(4) The accident—a brief statement of what happened at the moment to cause the accident

(5) First aid—description of recovery and first aid treatment, medical treatment, transportation, and disposition of the injured

(6) Associated information which includes personal characteristics of injured and fellow employes. Supervision—personal characteristics. Did they perform their duties? Did they foresee the danger? Should they have foreseen the danger? Were proper methods or practices used and the follow-up to see that they were used?

(7) Preventive measures — what steps were taken *before* the accident

Operating standards of the Philadelphia and Reading Coal and Iron Co. governing use of firing lines and the safety breaks in blasting.

General

1. The following rules governing the use of **Firing Lines** and the **Safety Breaks** have been established for the purpose of creating a safe and uniform method of blasting.

2. It shall be the duty of all Mine Officials to acquaint miners and other employes using explosives, of the rules and to see that the desired performances are obtained. New employes must be thoroughly instructed in these rules before being permitted to fire a shot.

3. The location, use and condition of the **Firing Lines** and **Safety Breaks** shall be under immediate supervision of the Face-boss, Fire-boss, Assistant Foreman and Mine Foreman, who will be responsible for the proper installation and maintenance of same.

4. In the case of new miner or miners, or other workmen joining a party, the official in charge shall inform them of the exact location of the firing point and the safety breaks.

5. Any person establishing a new **Firing Line** shall inform his fellow workmen of the exact location of the **Firing Line** and the **Safety Breaks.**

A—Firing Lines

1. Each working face shall have a separate firing line, constructed of No. 20 double cotton covered copper wire, except in gangways requiring a long firing line, a minimum of No. 18 rubber covered copper wire shall be used.
2. Firing lines shall be stretched and held firmly between wooden cleats to be spaced about twelve (12) feet apart. Shop made cleats and safety break boards will be supplied by the Assistant Foreman in each section of the mine.
3. The two (2) wires of a firing line shall be strung at least four (4) inches apart, to reduce to a minimum the chance of a short circuit.
4. The firing line shall be hung so that it is free from contact with the bottom, ribs or top; pipe or power lines, etc., as a precaution against stray currents.
5. Where power lines such as cables, trolley lines and transmission lines exist, the firing line shall be strung on the opposite side where possible to do so.
6. Where chutes, breasts, pillar holes, or other working places are driven in close proximity to each other, as in the case of half-chutes, quarter-chutes, etc., firing lines shall not stop at a point directly in front of any active working place.
7. All firing stations shall not be closer than twenty (20) feet of each other, to avoid the possibility of connecting to the wrong line.
8. Except when firing, the Blasting Machine shall be so placed as to avoid the possibility of its coming in contact with the terminals of the firing line; preferably in a place where it is under constant observation of the person who is to fire the shot.
9. Wherever practicable, the firing station shall be on the fresh air side of the blast to be fired, so that the man firing the shot will not be in the path of the smoke following the shot.
10. All shots shall be fired with a Blasting Machine approved by the Management.

B—The Safety Breaks

1. All Firing Lines must have at least two (2) breaks, the purpose of which is to prevent premature explosion.
2. All breaks in the firing line must be a safe distance from the face and out of the line of fire. (See Gen. No. 3.)
3. The terminals at the safety breaks and at the firing station must be shunted (twisted together) except when ready to fire, to eliminate the possibility of a premature blast. The man who places the shot shall remove the shunts and fire the shot.
4. The safety breaks will be established by running the firing lines on a board, about six (6) inches wide by fifteen (15) inches long provided with cleats for that purpose, and shall be securely fastened to the timber or rib. The breaks in the line will be made on this board.

Foreman and fire boss consult mine map in planning safe working conditions

to prevent its occurrence? What steps were taken *after* the accident to prevent reoccurrence?

(8) Conclusion—what went wrong to cause an accident? Who, if anybody, was to blame for what went wrong?

(9) Recommendations — what should be done to prevent a reoccurrence?

Varied Safety Activities Round Out Program

Bulletin boards located inside and outside the mines display circular letters, notices and bulletins relating to safety, also posters from the National Safety Council.

First Aid Training—An important part of the safety program, first aid training has been conducted continuously by the company since 1903. An inter-colliery first aid contest is held annually for the purpose of selecting teams to compete in the annual state-wide contest. The last contest was held September 11, 1948. The "John Ira Thomas Trophy," which is awarded to the champions was again won by the P & R C & I Co. which has held this coveted trophy since 1942.

Mine Rescue Training—Each mine has a crew of men trained in the use and care of the McCaa oxygen breathing apparatus. These men, about 60 in number, are trained by a local instructor, examined and certified annually by representatives of the US Bureau of Mines and Pennsylvania State Department of Mines. All apparatus is maintained at a centrally located rescue station.

Accident statistics are assembled in the compensation department and monthly reports showing classification of accidents by collieries as to cause, also the numerical accident rating of all operations, based on frequency and severity are posted monthly on bulletin boards at each operation.

State and Federal mine inspections are made regularly and it is the policy of the company to cooperate with them to the fullest extent. Constructive suggestions relative to safety are welcome at all times.

As a result of organized effort in safety, definite progress is being made in the reduction of accidents. It can be attributed to an educational program that has been in progress for many years, instructing men in the proper use and care of safety lamps, in operating standards governing the use of firing lines and safety breaks in blasting, proper care and storage of explosives, and safer wearing apparel such as gloves, foot wear, hats, goggles, etc. Some of the safe practices, devices, and methods introduced in and about the mines in recent years follow:

Specific Safety Provisions

Surface

Guards on machinery

Motor driven brush for cleaning safety lamp gauzes, also hood and 3 in. pipe with compressed air suction to discharge dust to outside of building

Safety tongues on slopes

Overwind and over-speed devices on hoists

Safety clevis attached to rope on slopes hoisting men provides side hitching in addition to the center hitch

Mechanically operated rock pushers on picking tables in cleaning plants

Electric signal or warning device on main ventilation fans

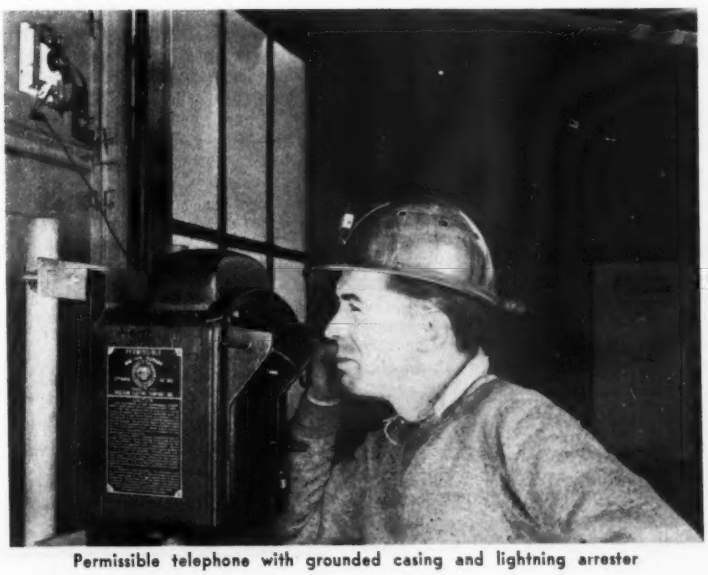
Retractable steel plate doors over shaft openings at collieries to protect men working on cages above surface level

Electric signal light in engine houses to indicate to engineers the position of shaft keeps on various levels

Electric signal devices for shafts having more than one level

The hoisting engineer throws a switch which permits signals only from the level hoisting

When men are to be hoisted the engineer is notified by telephone



Permissible telephone with grounded casing and lightning arrester

Metal shield separates electric welders and others in shops

Automatic electric block system controls cars at rotary dumps at breakers

Automatic warning signal at grade crossing on public highway

Mechanical whistles give warning when shots are to be fired at stripping dump near breaker. Similar whistles in breaker are blown when machinery is to be stopped

Electric light signal warns retail loaders when pockets are to be filled

Walk-ways constructed over shakers

General and Underground

Guard rails on locomotives to protect operators

Combination trip bell or light gives warning of approaching trips

Safety device is attached to rail near face of gangways to protect cars from injuring men at face

Trolley wire guards at all loading chutes

Cut-out switches and rubber aprons for men timbering or unloading supplies

Presented here are specific data regarding the safety programs of two coal mines operating under distinctly different conditions—one in the anthracite region of Pennsylvania and the other in steeply pitching bituminous in Washington. Both organizations make a continuous study of the causes of accidents, preventive methods, and improved education in safety.

Timber wedges are made in shop

Wet drilling is compulsory in rock work and is gradually being installed in coal drilling. Auger steel is used where water is not yet provided

Sprays are provided to allay dust

Permissible explosives are used exclusively in all types of mining except rock tunnels where a semi-gelatin type is used

All blasting is electrical. Delay detonators are used in all rock work and in coal mining where conditions permit

Strong storage boxes are provided and explosives are delivered to all working places

Operating standards governing the use of firing lines and safety breaks in blasting are provided

Forepoles in advance of the last set of timber minimizes the hazard from top falls

The standard hand lever chute-loading device is in general use throughout the mines

Mancatchers are in general use in manways in pitching veins.

Accident Record of Northwestern Improvement Company

By FRANK BADDA
Superintendent
Northwestern Improvement Co.

FOLLOWING is a brief outline as to what we have done along safety lines to reduce haulage accidents in our mines during the past three years. The types and causes of haulage accidents are too numerous to mention so that for comparative purposes I have listed them in two general classifications:

(1) Accidents caused from equipment failures

(2) Accidents caused by human failures

Equipment failures include defective locomotives, rolling stock, restricted clearance, bad track, etc. Human failures cover failures of employes to work safely or to comply with the company's safety rules.

During the period 1945 to 1947 inclusive, we have mined a total of 1,234,163 tons of coal and during that period there was reported a total of 289 compensable accidents; of this total there were 22 accidents chargeable to haulage. In analyzing these records, you will note that haulage accidents account for 7.6 per cent of the total. In further analyzing the record, you will note that equipment failures account for only 13.6 per cent of the haulage accidents while human failures account for 86.4 per cent.

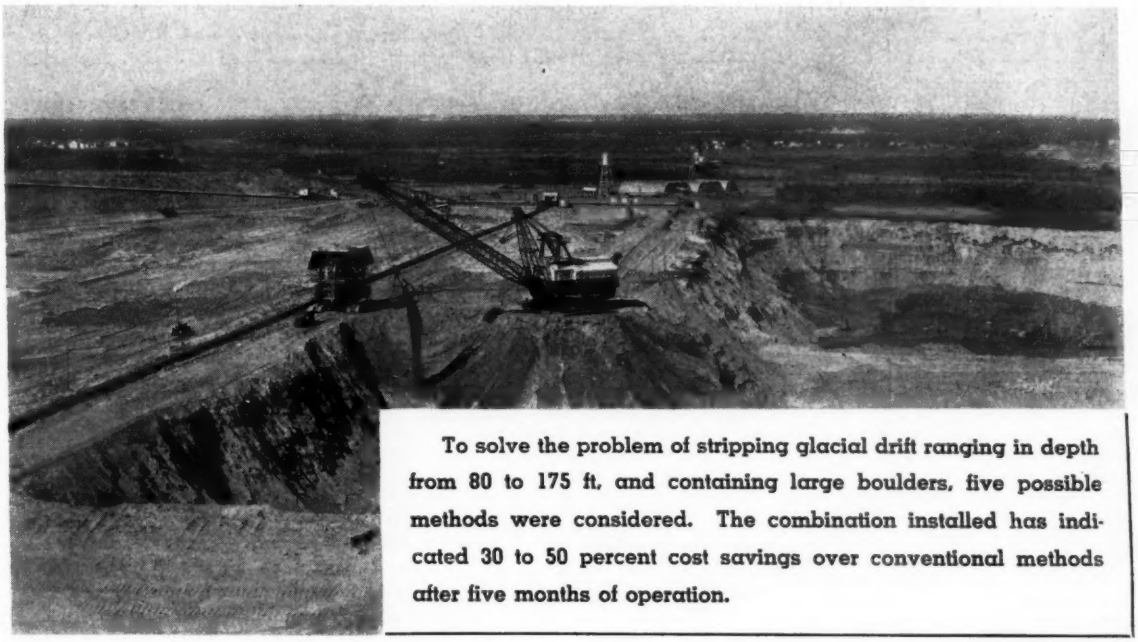
For years we have been continually striving to improve haulage methods by providing more clearance on haulageways, inspecting hoisting ropes and equipment daily, improving track and timbering on haulageways, and by prohibiting workmen from traveling on haulageways during actual hauling operations. Trolley locomotives are checked daily by the motorman and if found defective are immediately repaired, a set of safety rules and regulations are provided for all haulage crews, and various other improvements have been made so as to increase the safety of operation.

Progress in safety has been notable, and haulage accidents have continually decreased in recent years. However, it is obvious that the human element is still the greatest accident factor. The solution to this problem is to educate the workmen along safety lines and have them take more interest in safety matters. All employes should be made to realize and be ready to shoulder their share of responsibility and safety in and about the mines. Safety is not a one-man job nor strictly the management's job, but it is a problem that must be shared by employes and management alike.

CLASSIFICATION OF HAULAGE ACCIDENTS
For the 3 year period 1945-1947

	No. of Accidents	
HUMAN FAILURES:		
Lifting empty car on track	1	
Coupling cars while in motion	3	
Jumping off trip while in motion	6	
Stepped between cars and fell	2	
Empty cars hitting loads on parting	3	
Spragging cars	1	
Fell off trip	1	
Miscellaneous	2	
		19
EQUIPMENT FAILURES:		
Restricted clearance of haulageways	2	
Derailments	1	
		3
Total		22

Dragline and Conveyor Stripping At the South Agnew Mine



To solve the problem of stripping glacial drift ranging in depth from 80 to 175 ft. and containing large boulders, five possible methods were considered. The combination installed has indicated 30 to 50 percent cost savings over conventional methods after five months of operation.

Unique System Employs Large-Capacity, Portable Screening Plant and Self-Propelled Stacker

By EARL S. MOLLARD

Manager of Mines
Butler Brothers

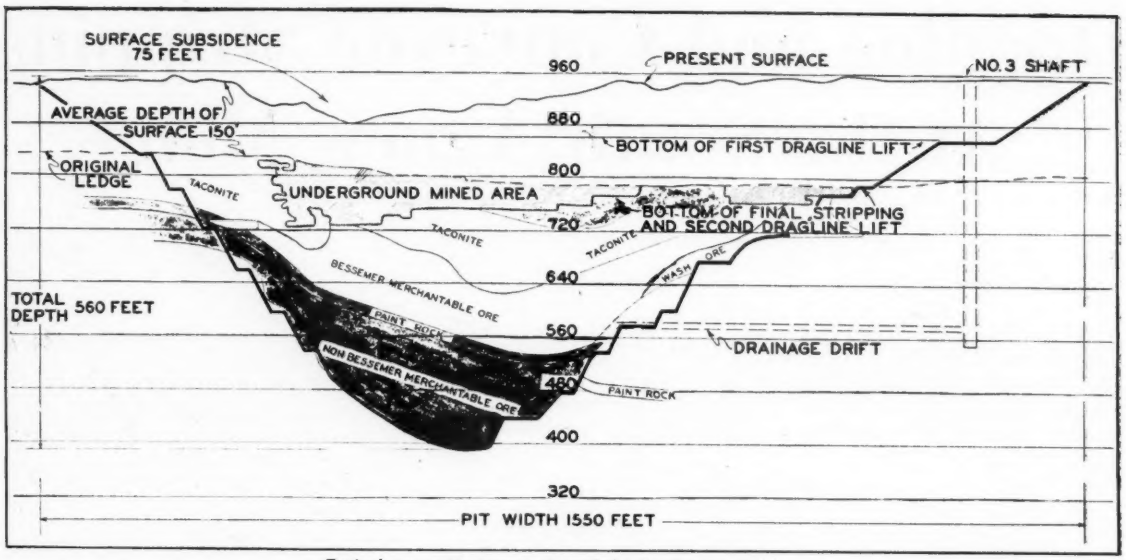
IN stripping operations on the Mesabi Iron Range the disposal of glacial drift presents an ever-growing problem. The depth of the ore body, the distance from the stripping area to the disposal area, the amount of overburden and the type of material in overburden are all factors that must be seriously considered in planning a stripping operation. The ground chosen for the disposal area must be near enough to the mine to give reasonable transportation costs and must not overlie ore that is likely to require open-pit mining at some future date. The planning of the stripping operation at the South Agnew mine presented an interesting problem in that all of these factors had an important bearing on the method of operation, from a cost standpoint.

The South Agnew mine is located adjacent to the village of Hibbing on the Mesabi Range of northern Minnesota, about ¼ mile south of the huge Hull-Rust Mahoning pit. Originally opened up in 1920 by the Inter State Iron Co., as an underground mine using the conventional Mesabi top-slicing mining system, the mine was operated for about 12 years, closing down in 1932.

Glacial drift covering the ore body varies in thickness from 80 to 175 ft. It consists principally of sand and gravel, with some of the material fine enough to be classified as quicksand and streaked occasionally with semi-impervious clay bands. Some of these clay bands are up to 20 ft in thickness. Large boulders up to 10 ft diam are frequently encountered.

Originally the ore reserves in the mine were between 8-9,000,000 tons, about 2,500,000 tons of which were extracted during the underground operation. The ratio of stripping to ore, before underground operation, was within reasonably economical limits for open-pit mining; however, the depth of the ore body, compared to its area, made conventional operation by rail haulage impractical. Steep grades and numerous switch-backs would have been required and a large percentage of the ore would have been tied up in maintaining track benches.

Although the stripping ratio has increased considerably because of extraction of ore by the underground operation, present-day stripping methods will still make it possible to mine economically by open pit methods. Due to the fact that sufficient dump space is not available in the immediate vicinity, heavy-duty



Typical open-pit cross section of the South Agnew Mine

truck stripping is not entirely practical. The nearest dump area requires a truck haul of about one mile, plus a vertical lift of about 250 ft. In order to deposit the waste material in the area available it is necessary to build up the stripping dump to a height of approximately 150 ft.

In analyzing the possibility of opening the mine, five different methods were considered: (1) conventional shovel and truck haulage operation; (2) truck haulage out of the pit, thence transfer to dump cars for rail haulage to the dump area; (3) truck haulage using a barney-car, truck-hoist system; (4) truck haulage out of the mine, thence transfer to conveyor belt for hauling to dump area; and (5) a combination dragline, screening plant, and conveyor belt system.

The fifth system appeared to have the greater possibilities for low cost operation, providing a suitable screening plant and stacker could be devised.

Various sized draglines were investigated and after an inspection of large dragline operations in the anthracite fields it was felt that a large dragline could deposit its load in a relatively small area without too great a loss of time in spotting. As approximately the same number of men would be required for operation of a small dragline and conveyor system as for the largest obtainable, it was decided to procure a model 1150B Bucyrus-Erie dragline equipped with a 180-ft boom and a 25-yd bucket. In order to haul material away from this unit, it was calculated that a 48-in. belt, travelling 550 ft per minute, would be required. By the use of a machine of this range, surface overburden can be removed in two levels of operation.

A 48-in. belt will not, of course, handle the large size rocks that a 25-yd bucket will root out of the ground. It was therefore necessary to design and build a screening unit to screen out all material oversize for a 48-in. conveyor, and which would have to be hauled out of the area by trucks.

Screening Plant Handles Large Boulders

To be practical the screening plant must be portable and be able to handle lump material up to 6 ft in diam. It would be impossible for the dragline operator to see and sort out rocks of any smaller size. A self-propelled

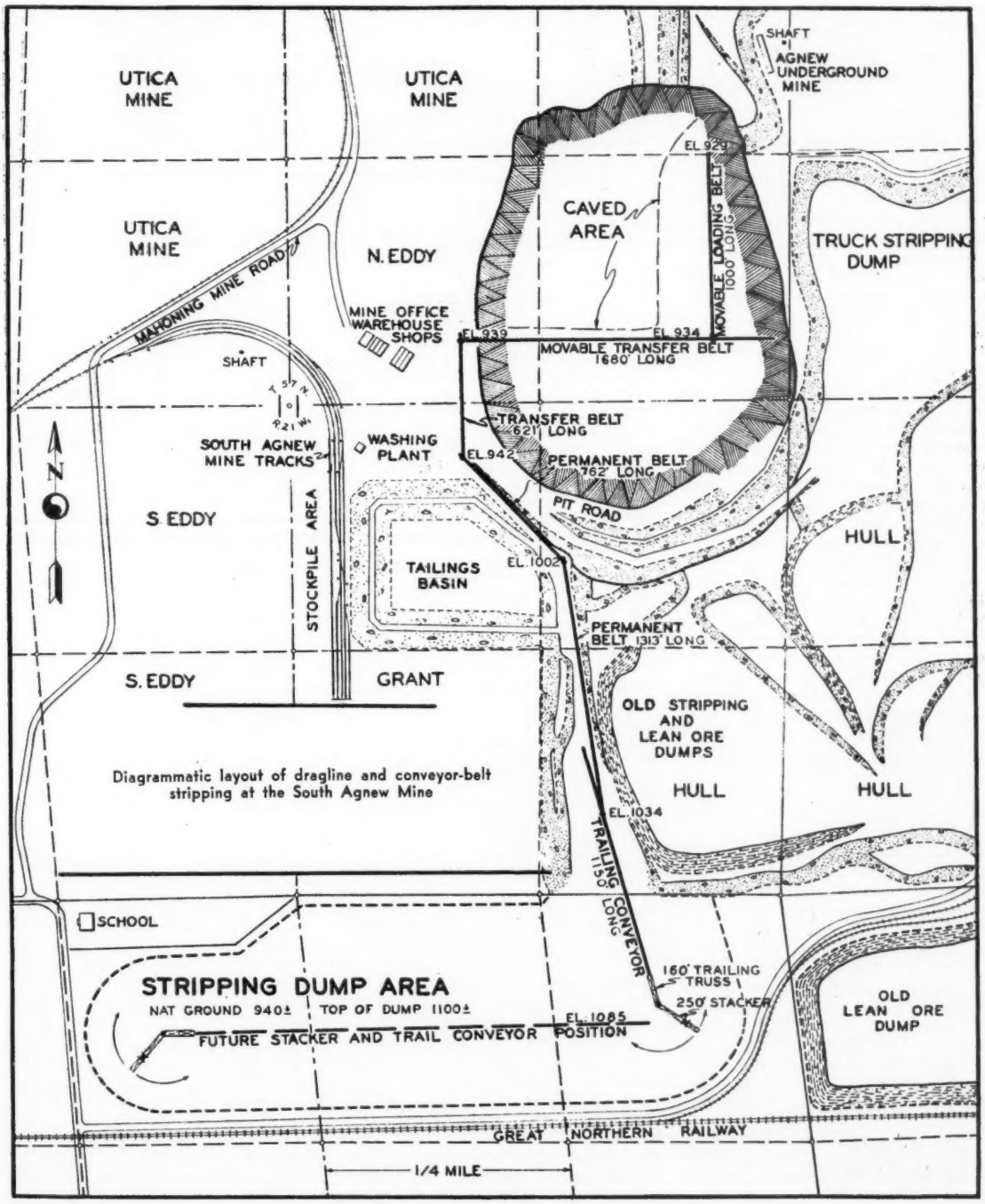
1150-B DRAGLINE

Working Weight	2,420,000 lb
Ballast	275,000 lb
Diameter of Base	44'-0"
Bearing Area of Base	1525 sq ft
Ground Pressure of Base	11 psi
Walking Shoes	8'x48'
Total Area of Shoes	768 sq ft
Ground Pressure of Shoes	21.9 psi
Over-all Width Outside Shoes	63 ft
Length of Step	7'-6"
Walking Speed	.11 mph
Length of Boom	180 ft
Motor-generator Set	1750 hp
Hoist Motors Two (2)	425 hp
Drag Motors Two (2)	425 hp
Swing Motors Three (3)	125 hp
Voltage Input	4000 v—60 cycle
Hoist Full (Stalling Condition)	232,000 lbs
Hoist Speed (Loaded)	350 fpm
Hoist Speed (Lowering)	660 fpm
Drag Pull (Stalling Condition)	260,000 lb
Drag Speed (at 75% of Stall)	250 fpm
Drag Speed Payout	540 fpm
Allowable Suspended Load	133,000 lb
Size of Bucket Inside	9'-4" wide x 7'-0" high x 13'6" deep
Weight of Bucket	63,220 lb
Capacity of Bucket	25 cu yd
Maximum Digging Depth 30 deg	110 ft
Dumping Height 30 deg	73 ft
Maximum Digging Capacity	1700 cu yd per hour
Estimated Digging Capacity (Hopper Dump)	1100 cu yd per hour (24 hour av.)
Depth of Overburden—Minimum	80 ft
Depth of Overburden—Maximum	190 ft
Depth of Overburden—Average about	160 ft
Average Width Dragline Cut Proposed	230 ft
Distance c/l Dragline to c/l Screening Plant	170 ft

model 550B shovel base on which to mount the screening plant was purchased. This base is equipped with hydraulic leveling mechanism.

Several types of sizing machinery including chain grizzlies, roller grizzlies, stationary grizzlies, and vibrating screens were investigated, and a manganese pan feeder 7 by 18 ft in size, feeding a 7 by 12-ft vibrating screen was decided on. Maintaining slopes in the hopper sides above the feeder at a 55-deg angle allowed the dragline a target 28 by 30 ft in size. The screen was set at an angle of 20 deg and operates at 900 rpm. The screen deck has longitudinal skid bars with an opening of 5 in. at the feed end and 9 in. at the discharge end. The undersize falls onto a 60-in. conveyor belt and the oversize into a hopper for transfer to trucks. It is anticipated that from 1 to 4 percent of the total material will be rejected over the screen as oversize. A hydraulically-operated quarter pan gate empties the material from the rock hopper at end of screen to 15 cu yd trucks. Belts of 60 in. size were installed in the screening plant principally to avoid spill.

A boom conveyor 40 ft long feeds the screen undersize material to the



Diagrammatic layout of dragline and conveyor-belt stripping at the South Agnew Mine

SCREEN PLANT

Total Weight (Empty)	1,093,065 lb
Size of Hopper (Top)	30'-0" x 28'-0"
Size of Feeder (Oversize)	7'-0" x 18'-0"
Size of Screen	7'-0" x 12'-0" Screen Openings: Top 5"x18" Bottom 9"x18"
Undersize Belt Feeder	60" x 36'-9"
Boom Conveyor Belt	60" x 40'
Size of Caterpillar Tracks	4 pr.-36" x 13'-6"
Total Ground Bearing Area	324 sq ft
Ground Pressure (Average Empty)	23.43 psi
Travelling Speed	0.2 mph
Propelling Motors (Four)	50 hp-200 hp total
Total Connected Horsepower	342 hp
Overall Heighth	18'-0"
Distance c/ Screen Plant to c/l Loading Conveyor	35'-0"

Gravity take-ups are used on all belts except the stacker. This has conventional screw take-ups. Ballast weights, for the gravity take-ups, are connected through a series of cables and sheaves to a pulley mounted on a carriage that runs on wheels. Dual-motor drives are used wherever the required horsepower exceeds 200, in order to provide enough wrap for driving the belt. Motors used have ratings of either 100 hp or 200 hp, and can be used either singly or in any combination that might be required in future installations. All electrical controls are interlocked, including those at the screening plant however, in starting, the screening plant must be started manually. As the conveyor system will not be used during sub-zero weather, no provision has been made for heating. The conveyor has been covered, making operation possible during heavy rains.

Direct labor required in operating the system consists of 12 men, including the dragline operator, dragline oiler, screening plant operator, one attendant at each of six transfer points, stacker operator, conveyor system oiler, and a mechanic. A bulldozer is used on a part-time basis for levelling off the dump area and the area around the screening plant and dragline. Additional labor is required

main conveyors through a self-propelled, rail-mounted hopper that straddles the conveyor belt. The boom conveyor is adjustable upward or downward enough to compensate for irregular ground conditions, and swings horizontally through an arc of 180 deg. The first two conveyor belts are skid mounted and can be moved by caterpillar tractors as dragline cuts are completed.

At present the conveyor system consists of two movable conveyors in series, allowing flexibility in making various shaped dragline cuts. This is necessitated by the irregular contours of the surface resulting from former underground operations. The movable conveyor feeds material onto the permanent conveyor system for transportation to the dump grounds. There the permanent conveyor feeds onto a trailing conveyor attached to a 245-ft, self-propelled stacker. The trailing conveyor is self-propelled, mounted on wheels and running on rails in its entirety. It is constructed in such a manner that additional belt can be added as required.

Rotating Stacker Distributes Fines

The trailing conveyor delivers the material to the stacker, and is supported at the tail end by wheels running on a circular track supported by the trailing conveyor head end structure, and held in place by a center pin. At a distance of 175 ft from this center pin is the other support for the stacker. This consists of two 54B Bucyrus shovel crawler treads individually powered by two electric motors, and carrying a ball and socket joint that connects the stacker structure to the propelling unit. Inasmuch as the crawler treads cannot track perfectly on a fixed radius, 7 ft of leeway is built into the ball joint support, and fitted with limit switches at each end of travel in order to prevent damage should the operator permit over-travel.

CONVEYORS

Belt—6 ply 48-oz duck—3/16-in. top cover—1/16-in. pulley side
Pulleys—head 48-in. rubber lagged, tail and takeup 36-in., snub 30 in.

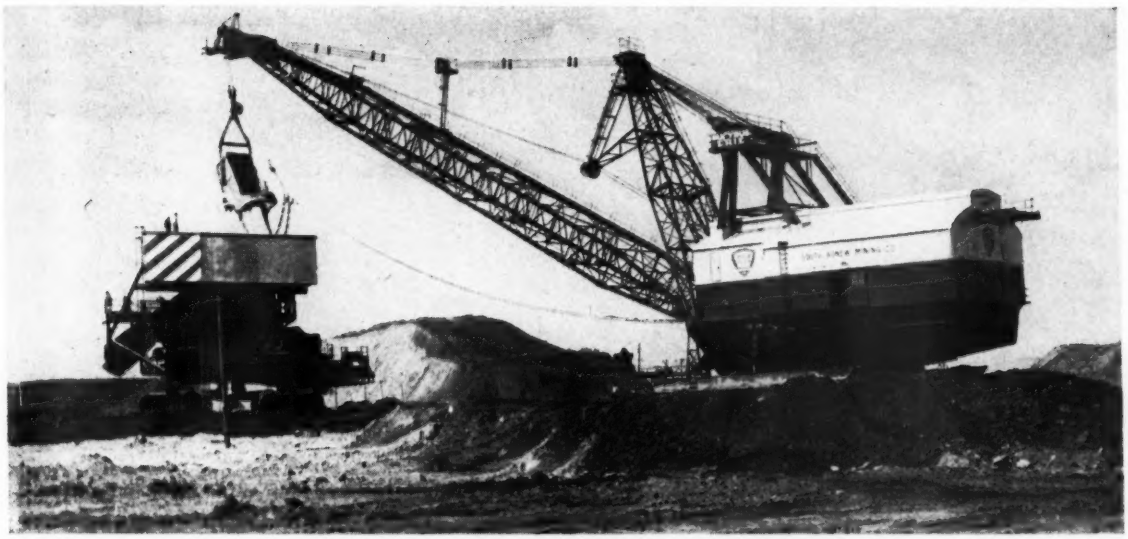
Belt width	48 in.
Overall length C to C initial	5851 ft
Overall length C to C ultimate	9831 ft
Speed	550 rpm
Maximum capacity	1700 cu yd per hour
Total connected horsepower initial	1725 hp
Voltage	2300 v, 3 phase, 60 cycle
Number of transfer points—initial	7
Total lift—initial	128 ft
Total number of troughing idlers	2258
Total number of return idlers	814
Horsepower traveling hopper	2 hp

STACKER AND TRAILING TRUSS

Belt width	48 in.
Belt speed	650 fpm
Length trailing conveyor—initial	300 ft
Length trailing conveyor—ultimate	2300 ft
Length stacker	245 ft
Total weight stacker and trailing conveyor truss—loaded	420,800 lb
Live load	88,000 lb
Horsepower stacker conveyor	200 hp, 2300 v, 3 phase, 60 cycle
Horsepower stacker propelling	2-15 hp-30 hp
Speed stacker propelling	15 fpm
Horsepower trailing conveyor	300
Horsepower trailing conveyor—propelling	2-5 hp-10 hp
Ground pressure stacker cat treads	12 psi

Devices for levelling the tail end support of the structure are provided, so that the belt will always be level as it travels through an arc of 180 deg in spreading the dirt over the end of the dump.

All belts throughout the system are vulcanized. All drive pulleys are rubber lagged and all snub and idler pulleys are, or will be, loose lagged in order to prevent dirt accumulation. Pneumatic tire idlers of 6 by 9-in. size are used under all transfer points and rubber chock idlers are used under the feeder and boom conveyors at the screening plant.



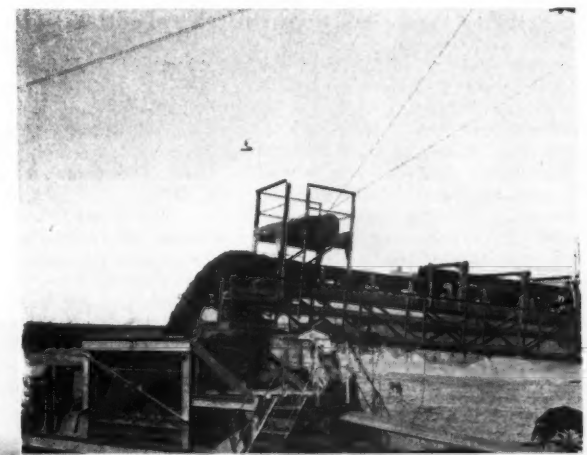
Portable screening plant handles rock up to 6-ft diam

at times to install track under the trailing conveyor as the conveyor is extended. One or more trucks are required at times for rock disposal.

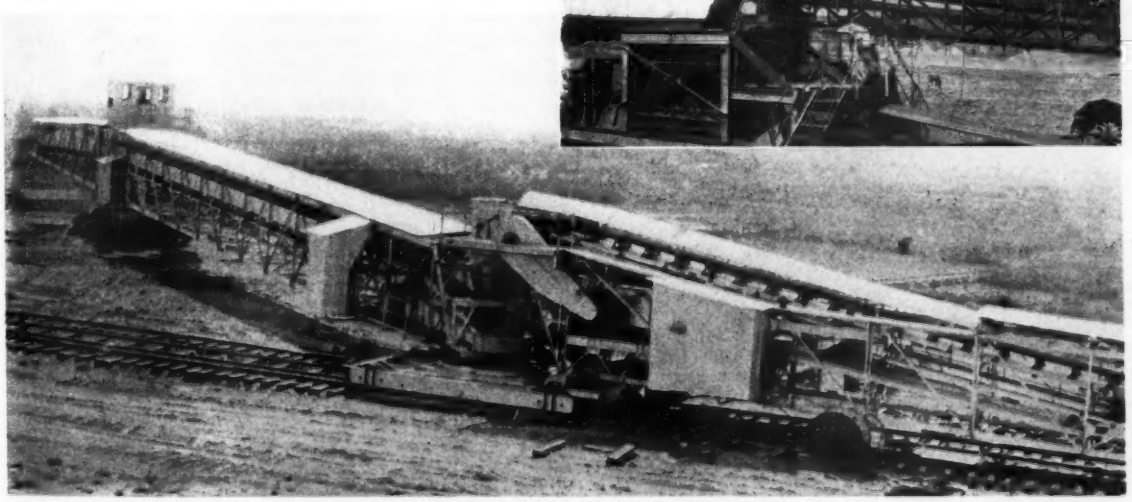
Expected output has been set at 600,000 cu yd per month, this based on an average output of 1000 cu yd per hour for 25 days. The system is being operated three eight-hour shifts per day, seven days per week, with from one to three shifts per week set aside for maintenance.

Full-scale operation of the system began June 1, 1948. To August 31, 1,595,000 cu yd have been moved. Though operating costs to date have been reasonably satisfactory, the small yardage moved and the short period of operation have not provided cost data adequate for publication at this time. Neither is a fair comparison possible at this early date between belt conveying and truck haulage. However, a saving of from 30-50 percent under conventional shovel track operating is indicated. As only the minimum lift is being taken at this time, this saving should increase with depth.

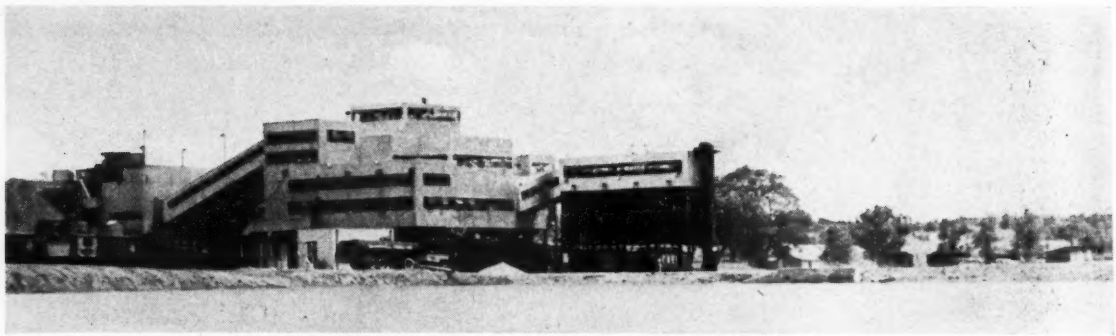
Operations to date have not been altogether ideal, as might be expected of a new layout, and some changes will be made when time permits. However, the basic idea is practical when similar conditions exist, or when the material is suitable, or can be made suitable for belt haulage and stacker disposal.



Fines discharge into rail-mounted hopper straddling main conveyor



Rotating self-propelled stacker distributes fines



The new Sunnyhill preparation plant by McNally-Pittsburgh

A New Continuous Mining Machine Announced

A NEW continuous mining machine, the Colmol, which combines the operations of cutting, drilling, shooting, and loading, was introduced to the industry by the Sunnyhill Coal Co. at their plant in New Lexington, Ohio, on October 27.

The model exhibited is the latest design resulting from trials and experiments over several years and is the co-invention of C. H. Snyder, president, and A. E. Lamm, vice-president, of the Sunnyhill Coal Co. of Pittsburgh, and V. J. McCarthy of Youngstown, Ohio. As illustrated in Fig. 1, it has a series of rotary drill heads, each having widely spaced and progressively receding teeth that chip the coal in overlapping concentric curves. The rotary heads also function as paddles which sweep the coal off the floor of the mine onto a conveyor which leads to the rear of the machine and delivers to the mine transportation system. The rotary chipping heads are mounted in separable upper and lower rows—five heads across—making a cutting pattern at the face as shown in Fig. 2. The normal dimensions of a cut are 9½ ft wide and 4 ft high, but this can be varied slightly by raising or lowering the cutting heads in unison as the thickness of the seam may require.

A completely mobile unit the Colmol is mounted on tractor treads. It moves forward under its own traction power, advancing the face continuously, and discharging a stream of coal onto conveyors at its loading boom. Hydraulic cylinders move the entire head assembly, tilt the cutting heads forward or backward, and vary the distance between the top and bottom rows of the cutting heads. Each of these motions is operated separately with manual control. The rotating heads require two 30-hp motors, the conveyor and the traction drive each have one 7½-hp motor, making a total of 75 hp for the entire machine. The rotating heads are capable of developing 3000 psi; the travel speed of the tractor varies from 20 to 35 fpm; and the low speed range for mining is from 0 to 60 in. per minute. All drives are hydraulic so these speeds have infinite variations. The machine has the following dimensions: height—38 in.; width—8 ft 6 in.; length 24 ft 9 in.; and weight 26 tons.

The Colmol has successfully operated in the hard structure Pittsburgh seam of Allegheny County, Pa., in the soft structure Upper Freeport coal in Preston County, W. Va., and at present is in the No. 6 Upper Kittanning coal in eastern Ohio. Based on these experimental operations, the Sunnyhill Coal Co. states that a production of three to five tons per minute is a definite possibility, and production may be even higher in thicker seams. Although the company feels that the machine has demonstrated its practicability, they still regard it as somewhat in the development stage as far as actual operating methods are concerned. It has been used successfully in the conventional room and pillar system, driving rooms at a 60 deg angle from the entries, and widening from the room neck. The widening, of course, is done in stages—advancing a 9½-ft cut for a certain distance and then dropping back and taking a parallel cut.

An assembly of 10 cutting heads cuts, digs, and loads

The cutting pattern at an entry face

Speaking the TRUTH about coal

Here's how our Speakers Bureau can serve YOU right in your own community

Did you know about our Speakers Bureau? It was organized over three years ago, and has now expanded to a group of more than 300 members—coal executives and men of long experience in the bituminous industry.

In the last 12 months these men have given more than 300 speeches in 26 states. The chances are that one of them is near your district, ready to help you gain the benefits of an educated and sympathetic community by giving an interesting, informative talk on the coal industry.

Why not write a request now for one of our members to speak at your civic or business-luncheon club, your church or other local gathering? If you would prefer to speak yourself, we will be happy to furnish you with all necessary materials.

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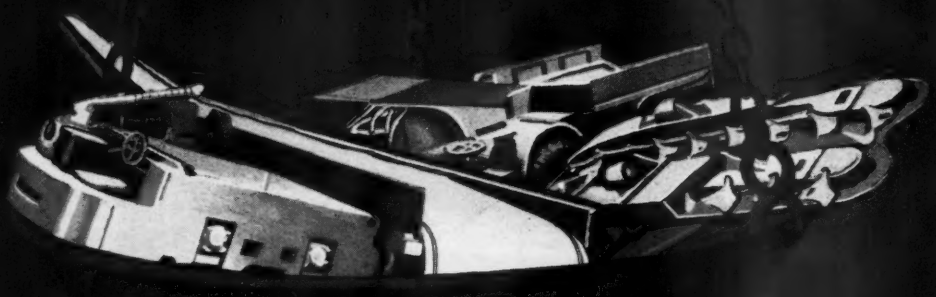

Balance

Modern full-seam mechanized mining cuts costs underground. No doubt about that!

But it also sends up raw coal with a high and fluctuating refuse content. Which, in turn, demands high-capacity precision cleaning to keep the prepared coal competitive both as to ash and sulphur content and price . . . now and into the future.

Heavy-Media Separation is the only preparation process that can cope with large and variable quantities of refuse in run-of-mine coal over the entire gravity range without loss of capacity or reduction in cleaning efficiency.

A strong statement, yes! But as results have again and again shown: *Only Heavy-Media Separation provides continuous withdrawal of large and variable amounts of refuse without volumetric limitation.* In existing plants this process has treated many millions of tons of feed from which *the sink removed runs three times the tonnage of the float.* It has even operated profitably on a product formerly discarded as a final refuse by a less efficient cleaning method . . . feed averaging 90% refuse!

Heavy-Media Separation closely duplicates washability curves . . . making a sharp separation over a full size-range at any specific gravity from 1.25 to 3.75 . . . maintaining any predetermined density continuously within ± 0.01. No other process approaches this efficiency. Yet if specifications change, the separating gravity can be quickly and easily adjusted.

For all these advantages, Heavy-Media Separation carries no compensating penalties. By continuous reclamation, loss of the low-cost separating medium is negligible. Equipment is standard, time proved. Operators need no unusual skills. Labor costs per ton are infinitesimal. Capital costs per-

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mit use on any seam worth mechanizing! Semi-portable plants from 5 to 125 tons per hour capacity are available for prompt delivery. For larger plants, Heavy-Media Separation units can be quickly designed on the basis of accumulated experience by a number of engineering firms.

Today, 30 Heavy-Media Separation plants are in operation treating metallic and non-metallic ores and preparing bituminous and anthracite coal. Seventeen new plants are being designed or are under construction for operation by the end of next year. Eight of these will be employed for coal preparation.

Cyanamid offers a complete range of Separation Processes by Gravity Difference (Heavy-Media Separation and the Dutch State Mines Cyclone Separator) for new cleaning plants or as adjuncts to present washers.

With a process for every size and specification, and no self-interest in equipment manufacture or plant construction, Cyanamid offers unprejudiced counsel on coal cleaning based on tests of your coal by various preparation processes in the Cyanamid Mineral Dressing Laboratory at Stamford, Conn.

We invite discussion and stand ready to run carload tests on your coal; to cooperate with engineers of your choice in the design of the most efficient separation units into your cleaning plant, and to provide the assistance of Cyanamid Field Engineers in tuning up the installation.

MINERAL DRESSING NOTES No. 16, COAL PREPARATION contains 38 pages of interesting descriptive data and test results on Heavy-Media Separation Processes and the Dutch State Mines Cyclone Separator Processes. A copy will be forwarded upon request and subsequent Technical Papers of the Cyanamid Mineral Dressing Laboratory sent to you as issued.

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Effect of Mechanical Mining on Preparation Plant Product

Comparative Data on Illinois Coals Covering the Transition from Hand to Mechanical Mining

By THOMAS FRASER
Supervising Engineer
Coal Preparation Section
and
WILLIAM L. CRENTZ
Coal Technologist
U. S. Bureau of Mines

COMPARATIVE data covering Illinois coals are made possible by the excellent work of early investigators, prior to the advent of heavily mechanized mining. Professor F. C. Lincoln,[1] in 1912 reported on the coal washing industry of Illinois, covering the 35 washing plants operating at that time. He compiled a general account of the history, practice, results, and cost of coal washing in Illinois from the erection of the first washery in 1870 up to 1912. Most of the plants studied by Lincoln are no longer in operation, but study of the data presented in his report shows a record not unfavorable in comparison to present day practice so far as ash reduction is concerned. In 1925, Fraser and Yancey[2] made a study of the preparation characteristics of slack coal from the No. 6 bed in Sangamon, Christian, Montgomery, and Macoupin Counties. Their investigation was undertaken at a time when the marketing of the smaller sizes of Illinois coal was a much more difficult problem than it is today. Several years later, the same two investigators[3] conducted a general study of the washability of various types of American coals. For Illinois, the report gives results of cleaning tests on a coal from the No. 6 bed in Franklin County and one coal from the No. 2 bed in Marshall County. In 1929, Callen and Mitchell[4] investigated the preparation characteristics of samples from seven mines in Franklin, LaSalle, Marshall, Peoria, and Williamson Counties. Some of this work was done in mining areas which since have been abandoned or have lost much of their importance due to the depletion of reserves during the past 20 years but the data are still of substantial value in evaluating the Illinois coals in general. More recently Mitchell and McCabe[5] made a thorough study of the washability characteristics, size-range, and chemical analyses of screenings from ten Illinois mines. A new series of samples was collected in 1947 to cover the preparation characteristics of Illinois coals under present day practices.

With the spread of mechanical mining, the quality of the coal has become a subject of major importance. Test data presented here show that with modern preparation methods, mechanically loaded coal is equal in analysis and size consist to the former products of hand loading.

Recent Tests

In this series of samples, representing the important coal beds now being mined extensively in Illinois, the recoverable clean coal readily obtainable by conventional coal-washing facilities operating at around 1.60 sp gr, ranged from 6.0 to 13.0 per cent ash. Test separations of these same samples at 1.30 sp gr, which is substantially below the range of practicable operation of commercial washing equipment indicate that many of these coals contain some material as low as 4.0 per cent ash, but the quantity of this low ash material is generally less than half of the original raw coal. A resume of these data is shown in Table I covering 12 tipple samples of commercial raw screenings.

Table I—Summary of Specific Gravity Separations of Samples of Screenings

		Ash Content, Percent on Dry Basis		
County	Bed	Raw Coal	1.60 Sp Gr Float	1.30 Sp Gr Float
Franklin	6	9.4	6.0	3.1
Macoupin	6	16.6	8.6	4.9
Madison	6	15.9	9.2	4.9
Fulton	6	26.4	8.9	4.5
Fulton	5	26.8	13.1	8.4
Grundy	2	18.7	7.4	3.9
Franklin	6	10.4	6.9	3.4
Sangamon	5	17.6	9.5	4.5
Sangamon	5	15.1	10.0	6.2
Vermilion	7	14.5	8.2	5.1
LaSalle	2	14.0	6.0	4.6
Perry	6	17.8	9.7	4.8

A review of these data in comparison with the early washing results presented by Lincoln in 1912 indicates that there has been no marked change in the quality of the rock free coal matter recoverable by washing at high gravity. The early record does not contain complete float-and-sink data of the coals but average washed coal ash data from Lincoln's work, transcribed in Table II, show products much like those recoverable by high gravity separation of the new samples from roughly analogous areas in Table I.

More complete information on the preparation characteristics of the raw coals were included in the reports of later years. A resume of the data published by Mitchell and McCabe (1937) transcribed in Table III in-

TABLE II

AVERAGE WASHED COAL ASH DATA FROM LINCOLN'S REPORT OF 1912

Pan Jig Washeries

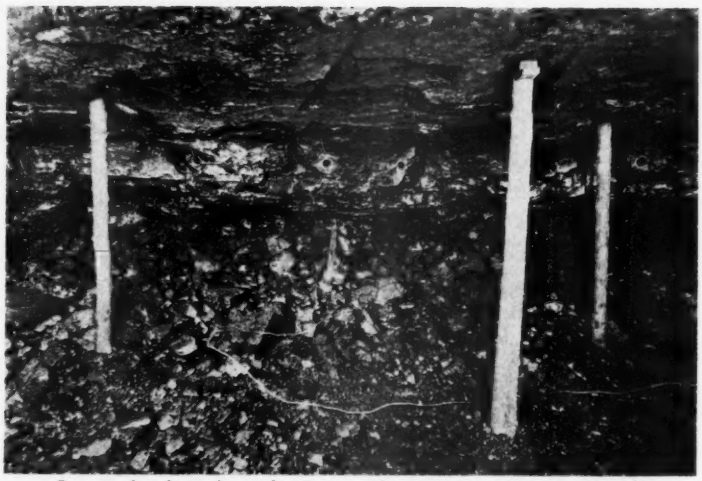
	Percent
Northern Field	8.34
Central Field	12.03
Southern Field	9.81

Lubrig Jig Washeries

	Percent
Central Field	11.41
Southern Field	8.99

dicate, with respect to both the rock free heavy gravity float and the purer coal material floating at 1.30 sp gr, that field by field the inherent quality of the coal being produced is not greatly different than that shown in earlier investigations. Notwithstanding the revolutionary changes in mining technology during the period since 1912 with widespread introduction of mechanized methods that virtually eliminate personal attention to the loading of clean coal at the face, there would appear to be no deterioration in the raw mined coal that cannot be corrected by proper preparatory treatment.

The effect of mechanization of production methods in loading dirtier coal might be reflected in the quantity of extraneous rock sent to the preparation plants; but even this idea, widely held in the industry, is not definitely shown by the series of published reports quoted above. Lincoln has not shown sink percentages but the data on refuse rejected at typical early plants may be taken as fairly indicative of the amount of refuse material loaded with the screenings. Table IV is a resume of these data arranged chronologically and, as near as may be by corresponding geographical areas. Obviously the interrelation of these several groups of samples is only very roughly parallel; but, taken as a whole, they indicate rather strikingly that the amount of refuse material loaded with the coal has not increased substantially during this long period of mechanization.



Care in breaking down the face results in improved size and quality

This general conclusion is further supported by average washery losses currently reported to the Coal Economics Section of the Bureau of Mines on their Annual Production Reports. Table V shows the average percentages of washery rejection at coal washeries operated in the State of Illinois in 1946 broken down into three broad classes of operations. Similarity of these data to those by Lincoln in 1912 is remarkable.

Table III—Summary of Specific Gravity Separations of Samples of Raw Screenings by Mitchell and McCabe

County	Bed	Ash Content, Percent on Dry Basis: 1.70 Sp Gr Float	1.30 Sp Gr Float
Henry	1	11.0	5.5
Woodford	2	5.7	3.5
Peoria	5	12.7	7.1
Vermilion	7	9.4	4.7
Sangamon	5	11.0	6.3
Christian	6	9.7	4.5
St. Clair	6	10.1	4.9
Marion	6	9.9	5.1
Williamson	6	7.2	4.1
Saline	5	7.5	4.7

TABLE IV

AVERAGE PERCENTAGE OF REFUSE IN TYPICAL SAMPLES OF ILLINOIS RAW SCREENINGS

Lincoln's Report of 1912

	Percent
Northern Field	28.0
Central Field	15.0
Southern Field	11.0

Mitchell's Report of 1935

	Percent
Northern Field	14.7
Central Field	14.6
Southern Field	10.3

Crentz Report of 1947

	Percent
Northern Field	20.2
Central Field	12.9
Southern Field	10.2

Primary separation by shaker screens starts the preparation process

Size Consist of Screenings

With regard to the size consist of screenings, a factor of great importance in appraising an industrial fuel, the earliest reliable published data are in a report prepared by E. A. Holbrook [6] in 1916. Holbrook examined 11 samples of Illinois commercial screenings shipped from mines in various parts of the State in 1914. There was some variation in top size of these samples as tested; but the data have been recomputed to relate all to the basis of 100 per cent through 1½ in. The summary, Table VI shows the percentages of ¼ x0-in. fines in parallel with like data of the year 1935 from McCabe and those of the present series.

Here again, the data have been arranged roughly by geographical areas and beds but obviously only broad comparisons are justified. As a whole, these data indicate a substantial increase in fines during the period from 1914 to 1935 with only a small change between 1935 and 1947, the period of the rapid mechanization of loading operations.

Table V—Average Preparation Loss at Washeries Operating in Illinois in 1946

	Number of Plants	Total Tons of Raw Coal Shipped to Cleaning Plants	Total Tons of Clean Coal	Percent Refuse to Raw Coal
Strip mined coal	20	15,828,113	12,845,073	18.85
Mechanically loaded coal	29	17,507,868	15,227,756	13.02
Other underground coal	8	108,050	91,950	14.90

Table VI—Percentage of Fines in Typical Samples of Illinois Industrial Screenings

County	Bed	1914—Holbrook	1935—McCabe	1947—Crentz
Grundy	2	24.4		27.5*
Woodford	2		45.0	
LaSalle	2			38.5
Peoria	5		33.0	
Fulton	5			24.5*
Fulton	6			34.5*
Vermilion	7	21.9	52.0	38.5
Sangamon	5	30.1	35.0	37.0
Christian	6	21.7	37.0	
Macoupin	6			45.0
Madison	6	27.1		42.0
St. Clair	6		39.5	
Perry	6	27.7		
Marion	6		38.0	
Jefferson	6			46.0
Franklin	6	16.3		46.0
Williamson	6		40.5	
Jackson	2	19.7		
Saline	5	29.2	35.0	40.5
Saline	5	34.2		
Gallatin	5			27.0

* Strip-mined coal.

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[1] Lincoln, F. C., Coal Washing in Illinois, University of Illinois Engineering Experiment Station Bulletin 69, 1913.

[2] Fraser, Thomas, and Yancey, H. F., Cleaning Tests of Central Illinois Coal, Bureau of Mines Technical Paper 361, 1925.

[3] Yancey, H. F. and Fraser, Thomas, Coal-Washing Investigations, Methods, and Tests, Bureau of Mines Bulletin 300, 1929.

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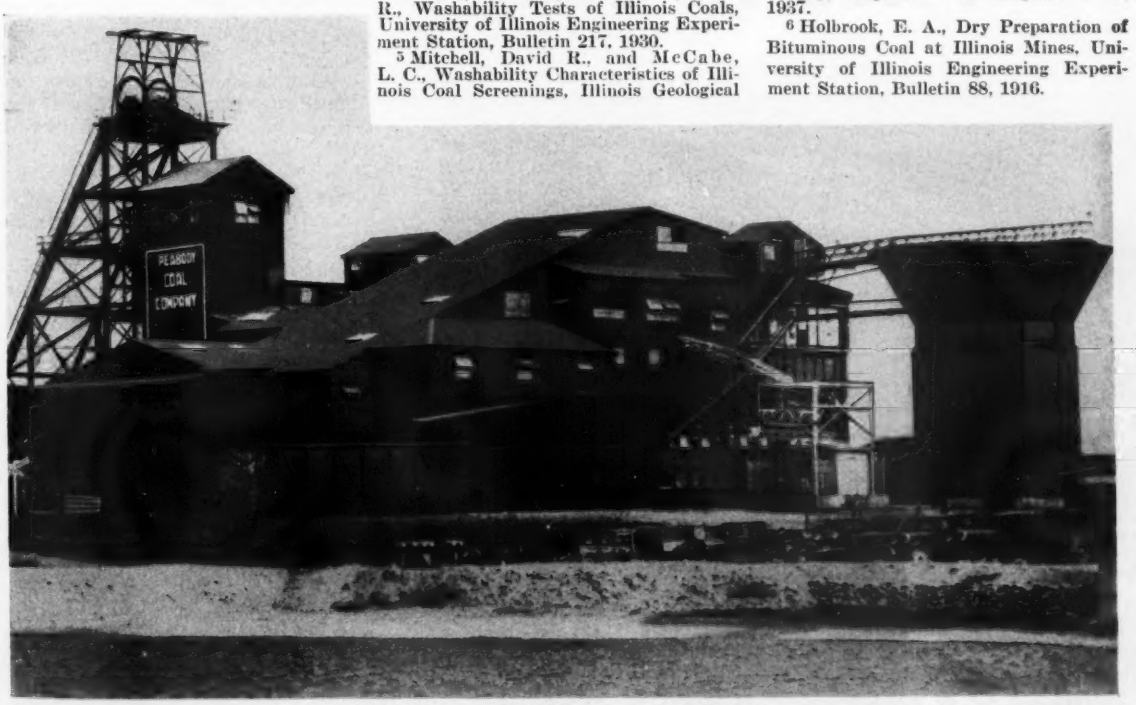

A modern coal preparation plant in Illinois

The JOY 12-BU, showing its relatively low height compared to man standing behind it.

JOY 12 BU-

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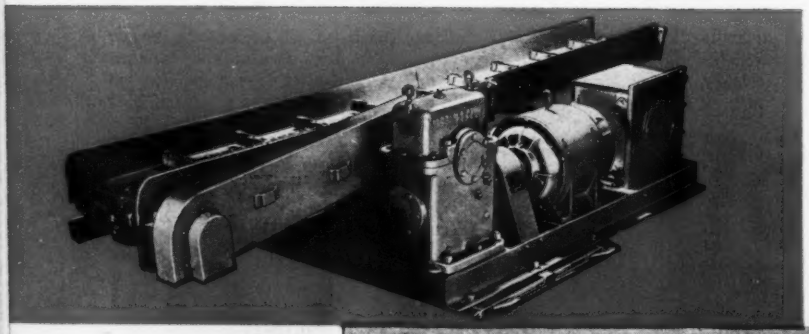

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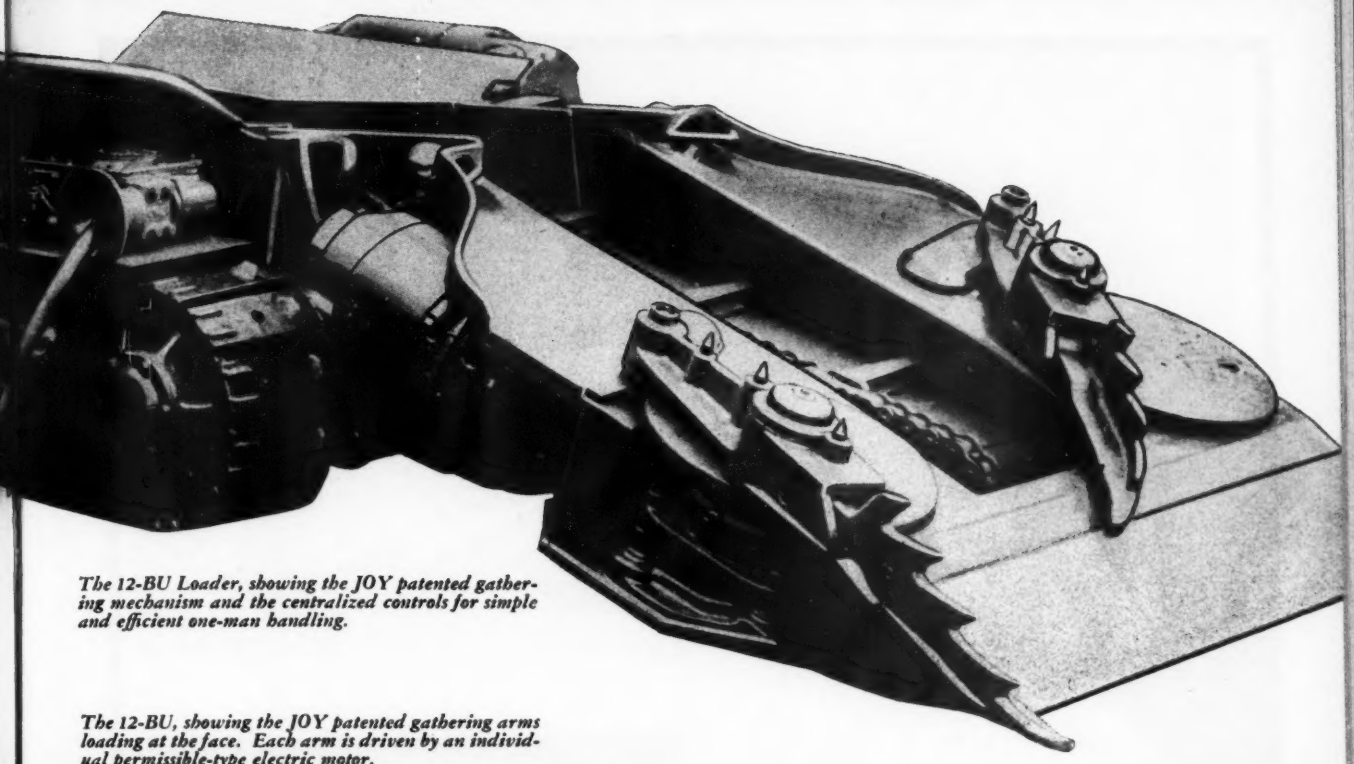
The 12-BU Loader working in a thin seam. The caterpillar treads are driven by individual motors. Permissible electric construction throughout... all parts in control system readily accessible.



The 12-BU Loader, showing the JOY patented gathering mechanism and the centralized controls for simple and efficient one-man handling.

The 12-BU, showing the JOY patented gathering arms loading at the face. Each arm is driven by an individual permissible-type electric motor.

The 12-BU loading in a thin seam. The entire machine has been ruggedly built for heavy-duty service and low maintenance.

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Committee members meet at Duquesne Club in Pittsburgh to plan Coal Show

Program For 1949 Coal Convention And Exposition Arranged

COAL mining is in for its biggest gathering of all time at the 1949 Coal Convention and Exposition of the American Mining Congress in Cleveland, Ohio, on May 9-12, and arrangements both for the sessions and the exhibits are well under way. Known throughout the industry as the "Coal Show," this meeting is expected to draw an over-all attendance of more than 10,000 persons from every branch of the industry and every section of the coal fields. Its aim and purpose are to promote progress in coal mining methods and equipment, to better working conditions in the industry, and to boost coal's position as a fuel and an industrial raw material.

To make the convention sessions of greatest value to all those attending, two types of meetings have been arranged by the Program Committee. Subjects of general interest to all fields and all branches of coal mining will be presented in single sessions which everyone can attend, permitting full discussion of important mining issues common to the whole industry. Special phases of deep and strip mining will be covered by concurrent sessions at other periods, affording opportunity for more specialized consideration of operating problems in these fields.

The general sessions will cover a wide range of subjects, including various aspects of coal mining research and marketing, management and personnel, and coal preparation. Included in the deep mining programs will be such subjects as face preparation, underground haulage, trackless mining, safety, power, and maintenance. The strip mining sessions will include papers on overburden drilling and blasting; heavy cover stripping with wheel, tower, and conventional equipment; current practices in the anthracite field; experiments in reforesting stripped lands; and contour mapping by aerial photography.

The entire program reflects a lot of hard work on the part of the National Program Committee, which carefully reviewed the many constructive suggestions received from operators and manufacturers throughout the country with a view to making the convention sessions of widest possible scope and maximum interest.

Although the meeting will run four full days, Monday through Thursday, no convention sessions are scheduled for Monday morning and Thursday afternoon, in order to give full opportunity for all mining men to inspect and study the manufacturers' exhibits. More than 190 companies have already reserved exhibit space, including many newcomers, and present indications are that the exposition will be 40 percent larger than the record-breaking show of 1947. The displays will feature everything for modern coal mining operations—all the latest developments in every type of machine, equipment, and mine supplies, as well as a number of new items to be shown for the first time. Operating displays will predominate as the manufacturers present their most recent contributions to the art of coal mining.

A popular feature of the 1948 Coal Convention in Cincinnati — moving pictures preliminary to each convention session—will be repeated at Cleveland next year. Latest films of the U. S. Bureau of Mines on subjects of particular interest to coal mining men will be shown.

Tentative entertainment plans include a Welcoming Luncheon on Monday noon, a Coal Miners' Party on Tuesday evening, and the Annual Banquet on Thursday. All these events are scheduled to be held in the Arena at the Cleveland Auditorium in order to accommodate a maximum crowd. Full details of the entire convention program will be carried in coming issues of MINING CONGRESS JOURNAL.

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The Role of Research in the Development of Labor-Saving Equipment and Methods—(Part II)

By E. R. BORCHERDT

Chief Research Engineer
Anaconda Copper Mining Co.

OF particular interest to open-pit operators and also contractors will be a completely self-contained mobile unit for secondary drilling that will appear shortly. It will be Diesel operated with a power take-off for the operation of a 320-cu ft air compressor. Four plugger drills connected through four hose reels each carrying 100 ft of hose will be available for drilling boulders ahead of the shovel while a light drifter mounted on a boom will be available for drilling horizontal holes in large boulders set off behind the shovel.

The trend of drilling for primary breaking in open pits is the reverse of that in underground drilling, so far as drill-hole size and weight of drills are concerned. Blast-hole churn drills of the heaviest type have appeared recently on the Mesabi iron range, for the first time. It is possible to increase the diameter of the drill holes with these heavy drills.

On the other hand, a large bore submarine-type piston drill was recently introduced, designed expressly to drill smaller holes at higher speed than possible with a churn drill.

Blast holes in exceptionally abrasive formations encountered in low grade iron ore mining have been put down successfully by the jet-piercing process. Commercial production of jet-piercing equipment is expected this fall.

In the explosives field, short-delay detonators have improved fragmentation so that in many cases hole spacing and burdens could be increased with no increase in secondary breaking. Improved fragmentation is of course valuable in reducing shock to loading and transport equipment and hence decreases maintenance costs. These short delay detonators have also noticeably reduced earth vibration from series blasting so that quarries can shoot more holes with delayed action caps than they dared with instantaneous blasting.

Mass Production from Underground Mines

During the past 10 or 15 years we have witnessed the successful application of bulk underground mining methods to a variety of low grade ores. These mass production methods were devised as it became recognized that low costs could be obtained by

Bottom-dump skip discharging

providing facilities to break and handle coarse material efficiently. This involved wide spacing of blast holes, large fingers, large chutes and chute doors, large cars, large skips and, frequently, underground crushers as well. Often, grizzlies were eliminated entirely. Climax, Chelan, Flin Flon, International Nickel, and Cananea offer examples of this.

Manpower applied to breaking boulders with hammers in order to pass rock through small grizzlies is pretty inefficient compared to electric power operating a modern crusher. A strong man can generate about ⅛ hp; with wages at $1.50 per hour, manpower then costs $12 per hp hour. Thus manpower is hardly economical in competition with electric power at 1c to 2c per hp hour.

The need for larger and heavier equipment in these mass-mining operations has influenced the design of loading and haulage facilities. At one property, where large tonnages are available, 260-cu ft tipple dump cars are used. These cars are loaded through air-operated chute doors 6 ft wide, with one spotting of the car. Research studies here resulted in the design of a completely new system of drawing and loading. Using grizzlies, output had amounted to 55 tons per man shift. With the addition of a scraper at the grizzly, output was increased to 75 tons per man shift. Further study and research developed the idea of a slide chute system without grizzlies, which was designed to handle this coarse material and with which output is now 153 tons per man shift.

Larger cars require larger locomotives, reduced track curvature, heavier rails and ties, and uniform grades. Rail weighing up to 90 lb per yard is in use. Track gauge of 36 in. or 1 m seems to be ideal for large haulage in that electric locomotive designers are afforded sufficient space between wheels for a highly efficient electric motor installation. As size of equipment is increased, reduction of weight then becomes an important consideration, and is being achieved through the use of high-strength alloy steels.

Conveyors are being used instead of rail haulage or skip hoists in some mines. After thorough research by the staff of the Consolidated Mining & Smelting Co., a 2500-ft inclined conveyor belt was installed at the Sullivan mine to raise ore through a vertical distance of 680 ft. The cost of this belt conveyor was estimated to be about one half the cost of sinking and equipping a shaft of equivalent capacity. Another point in favor of the conveyor was that it would require only 480 hp as compared to 1800 hp for the hoist.

However, for a horizontal belt conveyor, the initial installation cost is almost double that of a rail haulage system, although operating costs are approximately the same, so it is not anticipated that belts will generally supplant rail haulage in metal mines.

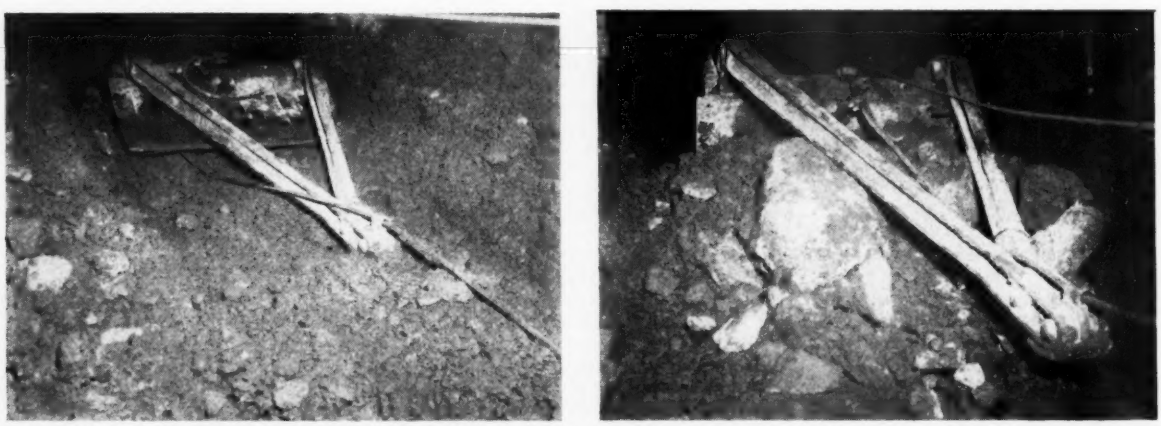
Ground support. All of us have seen massive posts and caps supporting only a small triangular arch of ground above the cap. In ground where there is no great degree of weight, timber merely performs the function of scaffolding. To support back lagging to prevent injuries from small sloughs from the back, a light pipe set or a light built-up timber set might be developed.

With the tremendous increase in timber costs it would seem desirable to exert greater control in order to effect economies in the use of timber, especially the use of minimum sizes consistent with the type of ground requiring support. Where ventilation is inadequate and treated timber is available, treated timber should be used; it is expensive but many times less costly than replacing untreated timber which has rotted. Under some conditions much greater life can be obtained from the timber by simply stripping off the bark. Barking is most easily accomplished when timber is cut with the sap in the tree.

Metal ground supports have been applied successfully where conditions of corrosion permit. Screw jack bars and aluminum or steel I-beams are used in coal mines. Steel channels supported by four pins are used for support of back lagging at one large nonferrous metal mine. Gunite lining alone has served to hold open drifts and large station excavations in ground subject to air slacking.

Ventilation. In hot mines, mechanical ventilation decreases mining costs through increasing the rate of expenditure of physical energy that is possible. This is best observed at mines requiring artificial cooling of air, mines at which production is held at high levels under conditions where this would not be possible without the artificial cooling.

At other mines, mechanical ventilation affords health protection against excessive dust. Life of timber, as



Scrapers with hinged blades move across the muck easily . . . and pull a full load to the grizzly

before noted, is materially extended through proper ventilation. With proper mechanical ventilation, compressed-air costs may be reduced because of the elimination of the need for its use for ventilation during the shift.

Loading equipment. Remarkable success has been attained with Finlay-type loaders in the small section headings encountered in underground mining. Loaders of the Conway type have given fine results in tunnelling work, and the adaption of the Joy type loader to hard rock work is of major interest.

Drifting costs could be further reduced if a loader were available that could load a train of eight cars at one time, or about half of the muck broken in a small section round. This would take advantage of the high loading capacity of existing machines, by eliminating slowdowns due to car service delays.

Compressed air. Many costly losses are incurred every day through low air pressures in mine workings. Insufficient compressor capacity is not always the cause. Improper layout or insufficient size of pipe lines and receivers may also be factors. Blowing compressed air for ventilation during the shift sometimes results in low air pressure through an entire section of a mine. Use of compressed air for pumping and hoisting is expensive and usually justifiable only where electric power is not available.

In pipe-line installation, use of couplings of the Victaulic or Dresser type is recommended, not only from the standpoint of eliminating coupling leaks but in the ease of installation and subsequent salvage of these lines.

In small-hole drilling, use of smaller bits and lighter drills reduces the compressed-air requirements. When it is remembered that 20 hp is necessary to compress 100 cu ft of air a minute, disregarding line losses, this is an important consideration. Especially is it worth while where a shortage of compressor facilities exists and substantial losses in drilling result from low air pressures at the working faces.

Side-dump cars and automatic trippers economize on labor

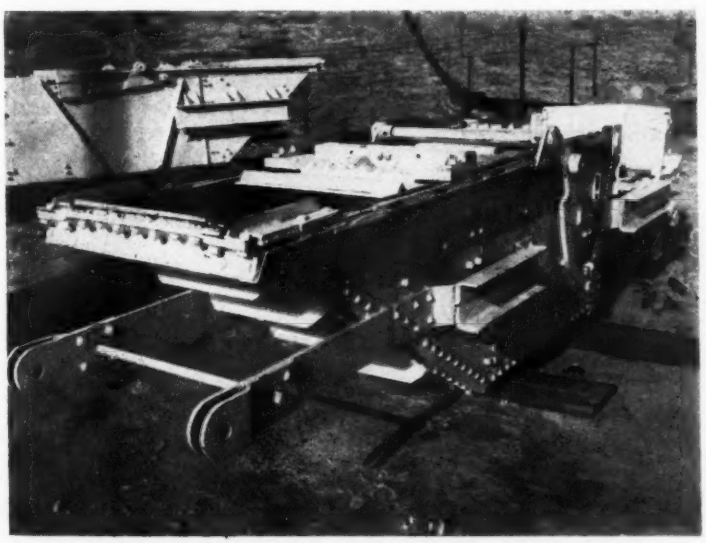
Fast slushing in a rail-lined drift

Shaft equipment. For many years shaft sinking was entirely a hard, backbreaking, hand-accomplished affair. Later, the development of the sinking pan in Butte eliminated some of the hard work, but it was not until a few years ago when Riddell applied the power-operated clamshell bucket to the job that shaft mucking was truly mechanized. Since that time many schemes have been devised both here and abroad, and it is believed that further improvements in mechanization of shaft sinking will be accomplished in the near future.

Reduction in the weight of skips and cages even when balanced hoisting is used makes it possible to reduce power required during acceleration and deceleration periods on account of the smaller mass of the moving system. This reduction also increases the safety factor of the rope and it is possible that the reduction in forces of inertia acting on a rope in starting and stopping will result in longer rope life. The big advantage, however, in using light-weight shaft equipment is in power reduction and extension of the useful depth capacity of a hoist used in unbalanced operation. Again, Canada and England may be considered pioneers in this field where they early applied aluminum alloys for cage and skip construction.

Aluminum, however, is anodic to almost every other metal and where acid mine water is encountered that might set up injurious reaction in joints, less reliance can be placed on inspection to detect weakness as it develops. This condition was experienced at the Hollinger mine shortly before the war and resulted in the design and construction of a large shot-welded stainless steel cage on which 70 men are raised or lowered at one time. The Edward G. Budd Co., that developed shot-welding of stainless steel railroad equipment, built this cage.

In Butte, bottom-dump skips are now standard equipment. Time per hoisting cycle has been shortened because of the fast dumping action. These skips are self cleaning and, when they are used in connection with



Use of self-cleaning, bottom-dump skips eliminates muck spillage

measuring pockets, muck spillage is virtually eliminated. In deep shafts muck spill is particularly harmful to shaft timber. Even centers and wall plates protected by rubber belting are subject in some degree to this abrasion.

The increasing difficulty in obtaining straight grain fir of quality suitable for shaft guides suggested the use of built-up or laminated guides fabricated from hard larch and modern synthetic resin glues. Their performance in the Butte mines under all types of conditions has demonstrated their practicability but certain problems in reducing their manufacturing cost have not yet been completely worked out.

Inspection and maintenance of guides is a major problem in high-speed hoisting with heavy equipment and the South African practice of using spring mounted rubber rollers instead of metal shoes to eliminate direct shock to the guides appears to offer a practical solution of the problem.

Looking Ahead

Another important field of mining research is the investigation and elimination of delays in the transportation of men and materials. Such investigations are useful also in focussing attention on the high cost of delays caused by shortages of supplies or equipment, and in helping to work out their correction through planning and coordination.

Antiquated methods of handling materials are quite prevalent in the industry. Careful studies that will result in the adoption of modern handling methods are definitely the field of the research engineer.

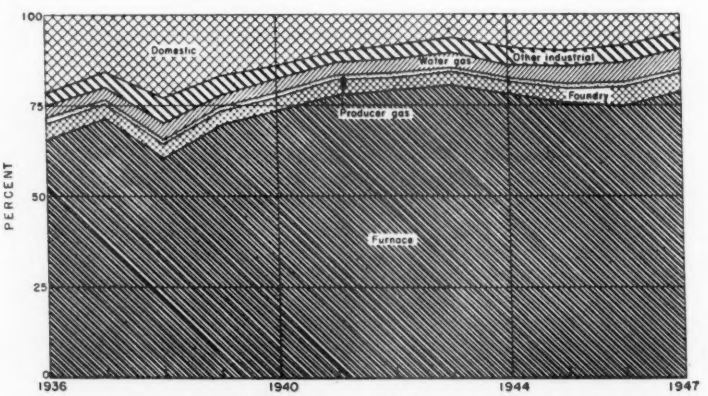
In the Anaconda organization, application of information gained through research studies is disseminated through current reports, through confidential reports to managers of various units covering entire projects and directly through job training or supervisors' training courses.

The benefits of research, mechanization, and labor-saving devices accrue to the miner as well as to the company. The miner's tasks are lightened and his work made easier. Reductions in costs and increased productivity make higher wage earnings possible for the miner. The most important requirement for successful mining research is to have someone with an open mind available to the organization undertaking the program, whose responsibility is to keep in touch with new developments and to find ways of adapting them to the operations of his own company, which with original research, will result in doing things cheaper and easier.

Distribution of Oven and Beehive Coke in 1947

(Extracted from U. S. Bureau of Mines Mineral Market Report)

THE total movement of large coke from ovens in 1947, as reported by producers fell short 280,256 net tons of equaling the 1944 wartime record but was 26 percent higher than the 1946 total. The metallurgical grades (blast furnace and foundry) were in extremely heavy demand because of the high level of operations in the iron and steel industry and total shipments to iron blast furnaces were the highest on record and foundry cupolas received the largest tonnage in 30 years. The quantity of coke that moved to blast furnaces in 1947 was equivalent to 79 percent of the total deliveries and foundry cupolas used about five percent (see accompanying figure). Shortages of metallurgical grades of coke in 1947 were further aggravated by the deterioration in quality which has occurred since the beginning of World War II, causing, in turn, a steady decline in the fuel efficiency of blast furnaces, the largest consumers. Based on information furnished by the American Iron and Steel Institute, blast furnaces used 154.8 lbs more coke to produce one ton of pig iron in 1947 than they did in 1941. This would indicate that with all other conditions the same, approximately 4,500,000 tons more coke was required to supply the needs of the furnaces in 1947 than would have been necessary if they had operated at the 1941 rate of fuel efficiency. Foundry men, no doubt, also found it necessary to use more coke per ton of metal charged into cupolas in 1947 than was required before the war. According to a one-time survey made by the Bureau of Mines covering the month of March, 1948, gray iron foundries used 1 part of coke to 5.96 parts of metal, a rather high ratio of coke to metal melted. There has been a significant increase in recent years in the quality of coke used for the manufacture of gas, both for use as fuel and for chemical synthesis. In 1947, the quantity of coke used for the manufacture of producer gas and water gas combined amounted to six percent of all shipments of large coke and the physical volume was 20 percent higher than in 1946 and nearly 59 percent above the quantity used for this purpose in 1941. Coke used for other industrial purposes (nonferrous smelting operations, chemical process industries, and other miscellaneous industrial purposes) accounted for four percent of the total movement and the tonnage involved was 24 percent more than in 1946. The continued larger requirements of coke for metallurgical and industrial purposes curtailed its use for domestic heating drastically in 1947 and total shipments to the domestic coke trade were the lowest since 1922, representing but five percent of all coke distributed. The shrinkage of the domestic coke market is clearly illustrated in the accompanying figure.



Percentage distribution of oven and beehive coke by principal uses 1936-47 (exclusive of breeze)

Annual Conference of The Coal Division

Reports on Important Operating Phases of Coal Mining are Presented for Discussion in Open Forum

ON November 9 the Committees of the Coal Division met at the Summit Hotel, Uniontown, Pa., to present their reports for open discussion and to plan new studies. The meeting, one of the most successful ever held, was attended by a large group of operators and manufacturers from a number of states.

A wide range of subjects on mine operation is being studied by the Committees. The reports presented to the Conference, being for the most part in preliminary form, will be published in MINING CONGRESS JOURNAL after approval by the Committees, but in the meantime, extracts are given in the following account. The material which the reports contain clearly show the great amount of time spent in making the studies. Certainly the industry owes the Committee members a vote of thanks, and thanks are also due to the many companies—mining and manufacturing—who are cooperating with the Division by furnishing data and assisting in gathering and compiling the information on which the reports are based.

Committee on Safety

JAMES HYSLOP, *Chairman*

STUDIES on mine safety have made good progress and two reports on haulage accidents have been published in MINING CONGRESS JOURNAL. James Hyslop, Committee chairman, who is making a study of mine fires and explosions, explained to the Conference that his investigations indicate that most of these have been due to one or more of the following: inadequate ventilation, inadequate rock-dusting; failure to avoid explosive conditions in worked out areas, and accumulations of combustible material. He pointed out that the immediate cause of a gas ignition is of secondary importance—whether by match, electrical spark, etc.—and that the most effective protection against mine fires and explosions is to prevent the occurrence of explosive atmospheres and the accumulations of combustible materials. Two reports on other phases of safety were presented as extracted in the following accounts.

SAFETY EDUCATION

By E. R. PRICE

SAFETY education is one of the most important phases of an effective accident prevention program, and it should be realized that the lead in any safety movement must be taken by the company management at the top level. As evidence of management's sincerity, the company must provide and maintain all reasonable safeguards for protection against accidents but these in themselves are not sufficient to prevent injuries to workmen. In the final analysis, the human element is the deciding factor, and no safeguard will ever be effective unless properly used and observed by the employes. It should, therefore, be the aim of an educational program to so inculcate safety habits that safe methods of working becomes automatic.

An effective program of safety education will focus the attention of the mine workers and officials on accident prevention. Education, which is the sharing of knowledge, disciplines the mind, and that is just as true in safety as in any field of endeavor. It is recognized that the type or size of an educational plan will depend upon the extent of the operations of each coal company, and it is, therefore, not intended that the program outlined in this report can be applied by the industry generally. The purpose of the Committee is to contribute toward a reduction in the toll of accidents now occurring and our suggested program is set up under the following eight headings:

(1) Policy and organization.
(2) Function of top management.
(3) Labor relations training for supervisors.
(4) Accident prevention training for mine officials.
(5) Safety instruction course for mine workers.
(6) Safety incentives.
(7) Safety education for schools in mining communities.
(8) General.

After describing in detail each of the above items, the report concludes with the following: The committee wishes to reemphasize two points. First, the purpose here has been to outline broad principles of education rather than to recommend details of procedure. Second, the subject of safety education has so many phases that this outline has not attempted to cover all possible avenues of approach.

* * *

SAFETY FACTORS IN PILLAR EXTRACTION

By W. D. NORTHOVER

THERE is no practical difference between pillar extraction with mechanical loading or hand loading except the continuous noise present; if the machine is not cutting, the drill or loader is operating. In the old days of pick mining there was no noise present except what the miner made himself and under these conditions, pillar extraction presented no more of a problem than the solid or advance work. In fact, the miner who drove up a room always looked forward to the pillar as a compensation for some of the difficulties met on the advance as he knew that the roof weight on the retreat would give him considerable easy coal. When it came time to make a fall his buddy, at the critical point, would listen while the back stump was being tickled to cause the place to start working. At this juncture *"quiet" was of the essence.*

Then came mechanization. The cutting machine which made noise, (but only while cutting) was followed by the loading machine and electric drill, which resulted in more noise and there is no use in kidding ourselves; herein lies the greatest hazard in pillar ex-

traction by machines. That is if we are really intent on high recovery rather than extensive stumping or haphazard mining with its consequent increased aggravating effect on the roof ahead or the strata overlying the haulageroads. There is one rule in pillar extraction that cannot be ignored: *"Enough coal must be taken out to let the roof down or enough left in to hold it up."*

What then is to be done in order to effect a sizable pillar extraction with machines and at the same time secure adequate safety?

(1) Take no more than 35 percent of the minable seam on advance; take 60 percent on retreat.

(2) Forget 100 percent recovery as a basis for computing comparable extraction percentages—no one ever got that much.

(3) Keep pillar lines in step—preferably 45 deg—not for the purpose of breaking the roof easier, but for the protection of the miner, the working places and equipment.

(4) Pillars should be recovered on full retreat and pillar lines kept on an angle of either 30, 45 or 60 deg, so that when falls are made, any particular pillar will protect the working place inby. For example, if the rooms are 300 ft deep, six places would be the limit to work at one time on a 45 deg break line. If the working places are numbered starting with No. 1 at the inby end and the six pillars were numbered say 10-11-12-13-14-15, then, in case a fall came No. 15 would protect No. 14 and No. 14 would protect No. 13 and No. 13 would protect No. 12 and so on.

(5) Where the first mining has been around 70 percent and small pillars have been left in—then before full extraction is attempted, at least 500 ft of barrier should be left between the small pillar area and the line where full recovery is to begin.

Committee on Surface Preparation

T. W. GUY, *Chairman*

THE Committee is actively engaged in a study on various phases of full seam mining and in the past two years, four reports have been completed and published in MINING CONGRESS JOURNAL—"Mechanical Cleaning for Full Seam Mining;" "Full Seam Mining With Mechanical Loading;" "Factors Which Influence Full Seam Mining;" "Coal Losses in Washer Rejects." T. W. Guy reviewed briefly the data that had been compiled in these publications and stated that further studies by the committee are now underway. In addition, the following two reports were presented to the Conference—"Experience With Control of Gob Pile Fires," by Henry F. Hebley, which appeared in full in the November issue, and "Comparative Data on Illinois Coals." This report shows, by statistics, the trend in refuse content of coals as mined during the transition from hand to mechanical loading and is published in full, beginning on page 41. Further study is recommended both by the Committee and by the industry.

Committee on Roof Action

FRANK G. SMITH, *Chairman*

IN making the study on pillar recovery, F. G. Smith stated that it is quite obvious that roof is one of the major controlling factors—in other words, if the roof would stay up, as we might say "automatically," there would be no particular problem in mining out all the coal.

The Committee recognizes that a high rate of extraction is frequently made in first mining, but whatever the method, economic factors decide what the percentage of coal recovery should be. Balanced against the value of the additional tonnage mined by a high rate of recovery, there is not only the actual cost of the extraction, but subsidiary items such as are shown in the following outline:

(1) Physical factors: Value of overlying seams, surface land, buildings and facilities

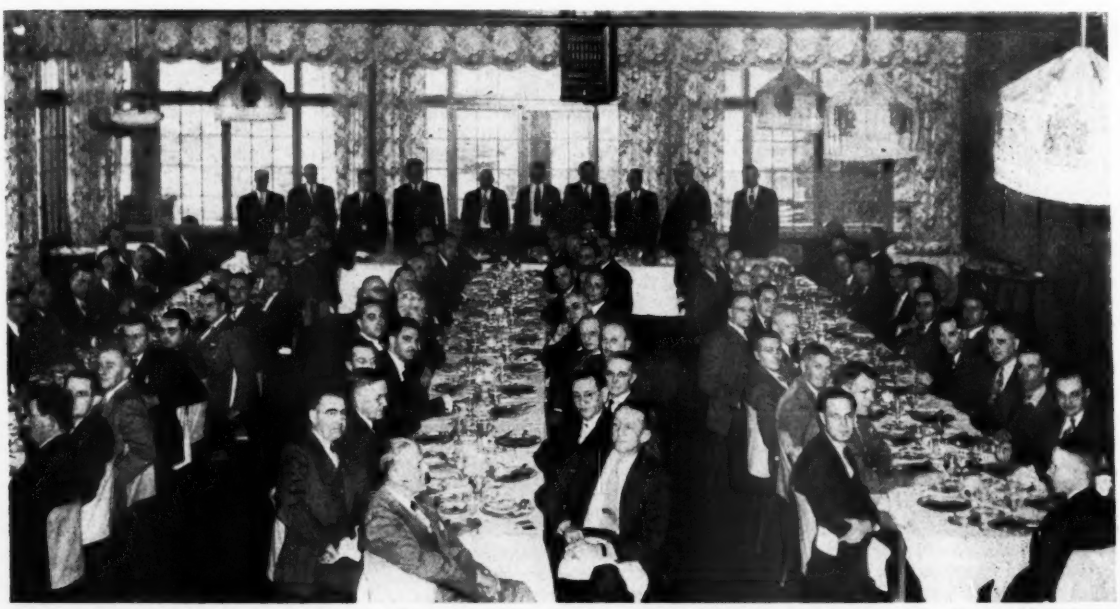
(2) Market factors: Effect of pillar crushing on coal sizes (realization), impurities as affecting market quality and preparation cost

(3) Investment: Effect of tonnage recovery on capital charges for plants, equipment, and mine development cost

(4) Operation: Increased or decreased cost of labor for pillar extraction

(5) Safety: Cost of safeguarding men and equipment, and preventing coal loss by squeeze or falls

Studies on these various phases are now in progress and two reports under the general headings of "Investment and Operation" were pre-



Operators and Manufacturers, attending the Conference, recessed for luncheon in the attractive dining room on Summit Mountain

sented to the Conference showing a comparison of the costs of full versus partial extraction under two different seam conditions.

* * *

FULL EXTRACTION AT HIGH COST

By D. C. RIDENOUR

THIS report covers a mine where the roof is difficult to support and where an attempt at full extraction introduces costs that are much greater than when partial extraction only is made. Estimates for each type of mining, based on actual known results, indicate that coal obtained by partial mining would be 22.9¢ per ton cheaper than that obtained by full extraction.

COMPARISON OF COST ITEMS AFFECTED BY CHANGING FROM FULL EXTRACTION TO PARTIAL MINING.

	Cost per ton (increase) or decrease with partial mining
Labor:	
Face cost	$.141
Developing cost	.027
Track and wire	.002
Ramp construction (credit)	(.007)
General—inside	.007
Supervision	.008
Main haulage	.001
Cleaning plant	.002
Vacation	.002
Social security	.003
Total labor	$.186
Supplies	.048
Power	0
Depreciation:	
Face equipment	.009
Items depreciated over the life of the property—(credit)	(.014)
Total credit	(.005)
Total reduction in cost with partial mining	$0.229

* * *

FULL EXTRACTION AT LOW COST

By G. N. MCLELLAN

THIS report showed two mining plans—one for 65 percent extraction in first mining only, and the second was a block system where 90 percent of the coal is recovered. His comparisons of costs are summarized as follows:

	90% Recovery	65% Recovery
Acres coal in panel	48	48
Tonnage in place	560,000	560,000
Tonnage recoverable	504,000	364,000
Days to develop and retreat	420	303
Material costs:		
Track	$22,119	$25,046
Wiring	3,365	5,350
Doors and brattices	3,608	1,036
Pipelines	1,915	1,915
Timbers	46,483	75,440
Total cost of material	$77,490	$108,787

When the above panel cost is applied to a property of 3000 acres, a 65 percent recovery shows a cost of 26¢ per ton, while a 90 percent recovery gives a cost of 17¢ per ton, a saving of 9¢ per ton on a recoverable (90 percent) tonnage of 27,000,000 tons.

The report points out that this figure applies only under the specific conditions of the coal seam for which the estimate was made and describes in detail how a number of operating and physical conditions affect the mining cost and the overhead.

* * *

MINE ROOF-FALL FATALITIES

By PAUL H. PRICE and J. P. NOLTING

THIS is preliminary to a geologic study being made to develop knowledge of roof rock characteristics that will aid in accident prevention of coal mining. It was published in October MINING CONGRESS JOURNAL and discussed at the Conference by Mr. Nolting.

Track and Belt Haulage

A. E. LONG,
Chairman, Conveyor Committee

C. C. HAGENBUCH,
Chairman, Haulageroad Committee

THE Conveyor and Haulageroad Committee have, for the past three years, been conducting a joint study on various phases of coal mine transportation under a variety of seam heights and grade conditions. The purpose is to show methods for estimating the installation and operating costs for track and belt haulage. Reports have been published on main line and on gathering haulage with both types of equipment and the final report now in preparation will show a combination of track and belts for a complete mine transportation system from the room necks to the tipple.

This study assumes a mine with a main line haulage length of three miles, a secondary haulage length of 4000 ft and room entries 2000 ft long, and the estimates are to cover 3 ft, 4 ft, and 6 ft seams. It was agreed by the two Committees that the complete transportation system will use track for the main line and belts for the room panel in all seam heights; for the secondary haulage, separate estimates are to be made for use of both track and belt.

Two preliminary reports were submitted at the Conference, one by C. W. Thompson on room entry haulage and secondary haulage with belt conveyors in a 3 ft seam, and one by J. B. Haskell and Robert Fletcher on a combination of track and belt haulage in a 4 ft seam. However, after some discussion, A. E. Long, Chairman, suggested that some additional data was indicated and it was agreed that another joint meeting of both committees would be held for a final review and check of the estimates before any figures are published.

Committee on Mechanical Loading

J. F. MAZZA, *Chairman*

IN the absence of J. F. Mazza, the work of the committee was outlined by E. H. Johnson, former Chairman. The Conveyor and Haulageroads Committees are making a joint report on coal mine transportation from the tipple to the room necks and Mr. Johnson explained that the Mechanical Loading Committee was completing the transportation cycle by covering the mining and the movement of coal from the working face to the gathering system. Recognizing that the face operations of mechanical mining are all interdependent, it was the opinion of the Committee that their study must necessarily include face preparation, loading, and service haulage as three integral parts of the one subject. The report is to be broken down into two broad subdivisions of track and off-track mining, as these are applied to two general types of operations such as, (1) where each of the face operations is performed separately as in the conventional type of mobile mechanical loading, and (2) where two or more of the face operations are combined by one piece of equipment, such as the shortwaloader which cuts and loads, or the duckbill which loads and gathers. Continuous mining will be a third heading under this classification. Preliminary reports have been prepared which are extracted in the following.

* * *

COMBINATION OF TWO FACE OPERATIONS

By G. W. STUMP

THE *duckbill loader* combines the two functions of loading and conveying it from the face to the gathering haulage at the room neck. The coal is cut, drilled, and shot down in the conventional manner and, in the operation studied for this report, the cutting is by a shortwall with an automatic bugduster. Drilling is with an electric drill and blasting is by permissible explosive. The report describes the organization of a face crew of three men in a 43-ft room mining a 34-in. seam. It concludes by submitting a typical time study, but pointing out that although the face cycle described is effective in certain

mines, particular conditions in other mines might necessitate variations.

Operation	Man minutes	Percent
Loading	268	19.7
Cutting	385	28.6
Drilling	112	8.2
Dusting	58	4.3
Tamp and shoot	108	8.0
Pan change	186	13.7
Delay	95	7.0
Idle	59	4.3
Timber and headers	85	6.2
	1,356	100.0

The shortwaloader combines cutting and loading, staying in one working place and moving across the face by ropes and jacks in the same manner as a shortwall cutter. The face is drilled and the coal shot down with explosives according to usual practice. After describing the operation in detail the report concludes with the following time study average of a typical operation that made three cuts of coal in a seam 49 in. high, mining a 35-ft room. Attention is called to the fact that drilling was included as a delay, because on an overlapping cycle, this should be done while other operations are going on.

Operation	Average time Min.	Percent of time
Moving	14	15.1
Loading	36	38.7
Extend conveyor	5	5.4
Tamp and shoot	24	25.8
Timbering	3	3.1
Supplies	1	1.1
Delays	10	10.8
Total	93	100.0

* * *

MECHANICAL MINING WITH EACH FACE OPERATION PERFORMED SEPARATELY

By Wm. E. Edmunds

THIS report describes an operation in a 70-in. seam of coal with 10 in. of parting in the center where the seam is mined selectively, cutting and loading out the parting before shooting the coal. The operation is with tractor loader and shuttle cars discharging into mine cars on the entry. The room and pillar system is employed but pillars are not extracted. The present method of selective mining requires that the loading machine enter each place twice—once to load out the machine cuttings made in the parting and again to load coal after the face has been shot down. However, the system is to be changed to full seam-mining as soon as a surface preparation plant now under construction is completed. It is expected that full-seam mining will give a much higher operating efficiency than the present system. All these points are brought out in detail in the report.

Committee on Underground Power

C. C. Ballard, *Chairman*

SEVERAL reports are now in preparation and C. C. Ballard called on the sub-committee Chairmen to give brief progress accounts. These included "Lightning Protection" by D. E. Stoetzel; "Cable Insulation" by G. W. Acock, and "Color Coding" by D. J. Baker. During the past year, the Committee has revised and approved a set of "Safety Rules for Installing and Using Electrical Equipment in Coal Mines" which, in cooperation with the U. S. Bureau of Mines, is now ready to submit to the American Standards Association. Upon acceptance by ASA, the rules will be adopted as American recommended practice.

Another report, of which the following is extracted, was presented and will be studied by the Committee for acceptance at their next meeting.

* * *

POWER SYSTEM FOR TRACK AND BELT CONVEYOR MINES

By J. O. Cree

THE purpose of this report is to show methods for estimating the costs of installing and operating a complete 275-v, d-c mine power system when coal is loaded mechanically for either a track or belt conveyor haulage system.

The conditions of operation, as given by the Conveyor and Haulageroads Committee in the reports of coal mine haulage are to be followed. As in these other reports, the information given herein does not apply to any actual operating mine, but is solely to show the methods of estimating the costs of power installation and operation. These estimates include the various items which will make up a complete power system as follows:

(1) Conversion units or substations
(2) A-C power supply circuits for conversion units
(3) D-C circuit along the main entry
(4) Gathering haulage circuits
(5) Face power circuits

In compiling the data on connected loads, this committee has assumed what is considered the average connected load for face equipment which will produce the desired 1200 tons per shift from the various seam thicknesses and grades, which were set out in these other reports.

The face equipment for the 3-ft seams is assumed to be conveyors, regardless of the grades, with an expected average production of 40 tons per face per shift. To obtain the 1200 tons per shift in 3-ft coal, 30 such faces will be required with a total face connected load of 1500 hp. Face equipment for the 4-ft and 6-ft seams is assumed to be mobile loading equipment with an expected average production of 200 tons per shift. Each loader section is to consist of a 40 hp or 50 hp loader, a 35 hp or 65 hp mining machine, a 2 hp or 7½ hp drill, and necessary transportation from the face to "room neck," with 60 hp in conveyors, 30 hp in shuttle cars, or 80 hp in track locomotive. Mines with level and 2 percent grades would require a total of 1080 hp and in mines with 4 percent grades, the total face connected load would be 1260 hp.

Assumptions have been made for the auxiliary equipment consisting of pumps, air compressors, rock dusting machines, and supply locomotives in the belt conveyor mines.

The report then presents detailed estimates on the cost of installing and operating the equipment in the five classification items given above.

Efficiency in installation means reduction in power costs

WHEELS OF GOVERNMENT

As Viewed by A. W. DICKINSON of the American Mining Congress

RETURNING to Washington from a rest in the South the President has indicated that his legislative program for the opening of the 81st Congress in January will include an excess profits tax, inflation controls, civil rights, an increase in the minimum wage, broadening of social security, public housing, and aid to agriculture and war veterans. He commented favorably on the work of the Herbert Hoover Commission and expressed the hope that the Commission's forthcoming report will mark a distinct improvement in economy and efficiency of Government operation. President Truman and Mr. Hoover are reported as seeing eye to eye on governmental administrative procedure.

There have been many statements that labor influence would upset the Taft-Hartley Act in the new Congress. Department of Labor attorneys are reported to be drafting substitute legislation for White House consideration. It should be remembered that the Chief Executive himself in January 1947, denounced jurisdictional strikes and called for the elimination of secondary boycotts and the outlawing of the use of economic force in labor disputes. In the railroad strike emergency in 1946 he even asked Congress to give him authority to draft strikers in essential industry into the Army.

While the legislative program will bring changes, these will only come about after due and probably lengthy consideration by the Committees and Houses of Congress.

Taxation

Talk of an excess profits tax to provide revenue for increased national defense and international aid programs lends added importance to the attitude of the incoming Chairmen of the House Ways and Means and the Senate Finance Committees. Ways and Means Chairman Doughton of North Carolina was definitely opposed to an excess profits tax last year. He has recently stated that he must first know "what we are going to be asked to appropriate and next, what the revenue outlook is under the present law. Then I can discuss any proposed changes." Finance Chairman George of Georgia states definitely that to impose an excess profits tax would lead "to destruction of business." If necessary, he would favor an increase in the normal corporation rate.

There has been discussion of increases in the present 38 percent corporation rate, ranging up to 50 percent. It is possible that the Committee on Ways and Means may first consider proposed amendments to the Social Security Act, in which event any excess profits tax consideration would hardly come up until after March 15. The special session Administration bill of last summer would have given a $50,000 specific exemption with an additional $50,000 allowed to corporations not in existence prior to January 1, 1940. The excess profits credit was 140 percent of that under the war-time tax and the proposed tax rates varied from 50 percent on income in excess of 140 percent to 80 percent on income in excess of 175 percent of the old credit.

Trade Agreements

On November 5 the State Department made public the intent to negotiate new trade agreements with Denmark, the Dominican Republic, El Salvador, Finland, Greece, Haiti, Italy, Nicaragua, Peru, Sweden, and Uruguay. Negotiations are to begin at Geneva, Switzerland, April 11, 1949. Public hearings on commodities to be included in the negotiations will begin before the Committee for Reciprocity Information December 7; applications to be heard will be received until November 29, with written briefs and statements to be submitted through December 7. Under the terms of the Trade Agreement Extension Act of 1948 the U. S. Tariff Commission will hold hearings concurrently with those of the Committee for Reciprocity Information. The Tariff Commission will then report to President Truman the extent to which U. S. tariffs may be reduced without causing or threatening injury to domestic producers; also what import restrictions might be required to prevent such injury.

Included in the list of commodities subject to possible concessions are baryte ore; talc; steatite; soapstone; bismuth; vanadiam ore or concentrates; and ferrochromium containing less than 3 percent carbon.

Steel Allocation

The Steel Products Advisory Committee to the Department of Commerce has approved the voluntary allocations of 26,400 tons per month for the manufacture of mining machinery, effective February 1949, and for six months thereafter. The manufacturers had requested 47,883 tons per month. The quantity allocated may be increased upon a further showing of actual requirements to the Office of

Washington Highlights

CONGRESS: Coming session an enigma.

TAX: Excess profits or corporation rate increase?

TRADE AGREEMENT: More Geneva.

STEEL: Mining machinery—26,000 tons.

BASING POINT: Senate Committee airs complaints.

STOCKPILING: Lead producers to furnish metal.

PORTAL-TO-PORTAL: Act upheld.

LABOR: Courts and NLRB uphold Taft-Hartley Act.

ST. LAWRENCE: New York State development opposed.

Industry Cooperation, which will distribute a form to obtain needed data. A public hearing was held on the program December 7, and approval by Commerce Secretary Sawyer and Attorney General Clark is anticipated shortly.

Steel allocation for maintenance, repair and operation of bituminous coal mines is to be considered at a later date. No industry advisory committee has as yet been appointed on allocations for metal and nonmetallic mine maintenance, repair and operation.

Basing Point

The Commerce subcommittee under Senator Capehart (Rep., Ind.) has been holding hearings since November 9 in its study of the economic effects of the Supreme Court ruling on the basing point pricing system. Senator Ed Johnson (Dem., Colo.), who is expected to become Chairman of the Commerce Committee in the 81st Congress, is said by Senator Capehart to concur with him in his views on basing points.

Capehart has stated that the hearings make it clear that removal of the basing point system benefits big business to the detriment of small business. A preponderance of witnesses have testified that the fob price practice places small companies at a competitive disadvantage. The Senator emphasized that companies should be permitted to "absorb any or all freight without being in violation of any law, providing two or more persons do not conspire to do so."

Two Federal Trade Commission lawyers stated to the Committee that the Supreme Court's decision has created a confused situation, and that many administrative and judicial changes have been made thereby in the anti-trust laws which "are inconsistent either with the implied intent of Congress or with its expressed intent."

Vice-President J. L. Block of Inland Steel Company pointed out that rigid mill pricing would create monopolies for single producers in some areas, while in other localities purchasers would find themselves subject to the whim of a few suppliers. Block suggested that price should mean either the delivered price or the plant price, depending upon the seller's prevailing selling methods. Some of the smaller steel producers testified that under the Supreme Court ruling their plants would cease to exist, bringing "ultimate concentration of all major industry at the doors of the large, fully integrated steel plants located in those districts where the virgin metal pig iron is produced at the cheapest possible price by reason of the favorable situation as to raw materials."

Stockpiling

At a further meeting on November 9 with representatives of the Office of Industry Cooperation, Department of Commerce, lead producers and importers stated that they would aid in supplying metal for the permanent stockpile through contracts to be made with the various companies. Participating in the meeting were representatives of the Munitions Board, Bureau of Federal Supply, National Security Resources Board, Bureau of Mines, and ECA.

This plan is similar to that agreed to by the producers of copper and zinc. The tonnage objective for the lead stockpile was stated at 70,000 tons by June 30, 1949, of which 19,000 tons is now pledged under contract.

Assisting the Federal Bureau of Supply in consultant capacity on lead purchases is Irwin H. Cornell, retired vice-president and sales manager of the St. Joseph Lead Co. Former WPB Copper Division head Michael Schwarz is also a consultant to the Federal Bureau of Supply, particularly in connection with purchases of copper for the defense stockpile.

Come, come Smedley! Put on a pair of overalls and let's get in on some of that dough we're paying for overtime

Portal-to-Portal

The U. S. Supreme Court has upheld the appellate court at Richmond, Va., and the District Court at Baltimore by voiding back pay claims filed by 13 employes of B. H. Hubbert & Sons made prior to the passage of the Portal-To-Portal Act. This case does not involve the validity of the Act as a whole but it does sustain the constitutionality of the retroactive feature. The Supreme Court is expected to rule later on a General Motors Corp. case in which employes have challenged the constitutionality of the entire Act.

Enacted May 14, 1947, passage of the Act was brought about by fantastic claims for back pay and overtime, outside of express provisions of contracts. At that time mining companies were faced with suits aggregating many millions of dollars. These claims and suits arose following the Supreme Court decision in the Mt. Clemens Pottery Co. case in the Spring of 1946. The current litigation is a test of the Act.

The Supreme Court has also upheld the sections of the Act providing that (1) no employer shall be liable for back pay claims under the Wage-Hour Act if he proves that he acted in good faith in conformity with and in reliance on official rulings or interpretations of the appropriate Government agency, even though such rulings may later have been modified or ruled invalid by the court; and

(2) a Federal court may disallow liquidated damages or may award less than the amount set forth in the law, where the employer shows that he had reasonable grounds for believing that his act or omission was in good faith and not a violation of the Wage-Hour Act.

Labor Rulings

In the International Typographical Union (AFL) contempt case, discussed in previous JOURNALS, the U. S. Circuit Court of Appeals in Chicago complied with NLRB General Counsel Denham's request to vacate a stay of the District Court's contempt citation. District Court Judge Swygert immediately directed the ITU to comply and the union has filed a statement that it is no longer demanding closed shop provisions in contracts with newspaper publishers. However, union officials are reported to be advising their local unions to negotiate contracts with newspapers in which a provision would be included that clauses covering conditions of employment would "become immediately inoperative on repeal or amendment" of the Taft-Hartley Act.

The CIO Steelworkers' Union has petitioned the U. S. Supreme Court to rule that the Taft-Hartley Act requires management to bargain on pensions and retirement plans, and to hold the non-Communist affidavit provision of the law unconstitutional. The union action results from the NLRB ruling in the Inland Steel Co. case where the Board forced the company to bargain with the union on a pension plan, on condition that the union comply with the Taft-Hartley Act provision on non-Communist affidavits. Union counsel argued that the affidavit requirement violates the constitutional guarantee freedom of thought and speech and is "vague and indefinite and imposes tests of guilt by association."

The NLRB has held that the Taft-Hartley Act yields superiority to State laws which "prohibit" compulsory union membership agreements, but not to State laws which merely "regulate" such agreements. In the case of the Northland Greyhound Lines the union involved had petitioned the NLRB to poll employes of the transportation company on whether they desired a union shop. The Board held that since many of the employes operate across State lines, they are considered eligible for a union shop as long as their operating base headquarters is outside of the State having laws which prohibit the union shop.

St. Lawrence Project

In the Great Lakes-St. Lawrence Seaway and Power Project controversy, the Federal Power Commission has concluded hearings on the New York State Power Authority's petition for authorization to construct hydroelectric facilities. In its opposition brief, the St. Lawrence Project Conference emphasized to FPC that it lacks jurisdiction to issue the license requested by the New York Authority. The brief declared that if additional power is actually needed it can be had quickly and at much lower cost by construction of steam generating facilities.

Chairman Wiley (Rep., Wis.) of the Senate Foreign Relations subcommittee on the St. Lawrence Project has told FPC Chairman Smith that if separate authority is granted to construct hydroelectric facilities on the St. Lawrence, it will practically kill the seaway project. Wiley emphasized President Truman's objection to dividing the project and urged rejection of the New York Power Authority application.

Canton Devices Pay Your Dividends

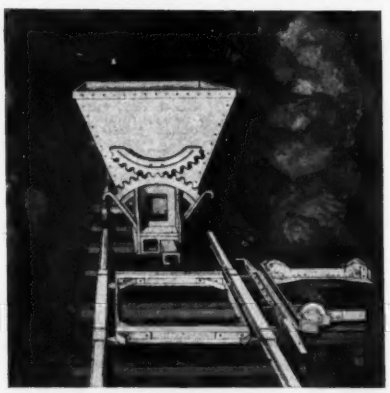
The American Mine Door Company specializes in mine items that pay for themselves through economy and increased efficiency. Less labor—increased coal output are the reasons.

Automatic Door

There is no slow-down or hesitation, there is nothing protruding from the wall. Cars never touch the door as they are flipped open by the mechanical mechanism attached to track. The doors click shut after passing of the trip. No trapper boy to get hurt.

"Canton" Car Transfers

Load a whole train of empties on a single track with one "Canton" Car Transfer. Built for all sizes of rails now in use. 20 seconds' time for a car change, 2 minutes to remove car transfer from track, 2 minutes to install on track.



"Dustributors" by Canton

All sizes and capacities, large and small mines. Our Mighty Midget is illustrated. In actual performance has distributed more than a ton of dust per minute during an entire shift including transporting and filling time. Easily transported by any conveyance. Write for complete catalogs.

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The Canton Switch Thrower is a fast, dependable solenoidal mechanism automatically throwing switch points ahead or behind the trip running at full speed. It is operated: (1) by the motorman; (2) by remote control; (3) by hand, and is adapted for use as an automatic de-railer.

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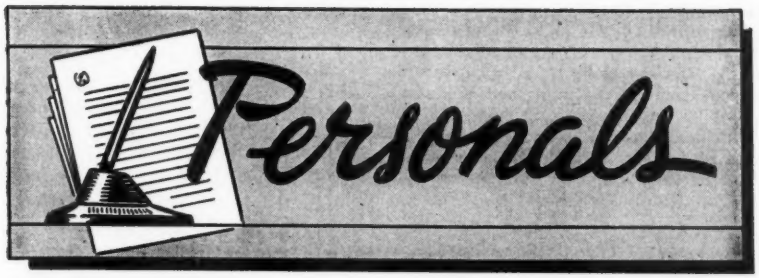


William J. German, formerly general superintendent of Pocahontas Fuel Co., Inc., has been appointed by General Clay as chairman of the U. S. Coal Control Group in Germany. He will function in cooperation with the Coal Control Group of the United Kingdom in a joint effort to stimulate coal production in the Ruhr coal fields. **Robert Estel**, former chairman of the U. S. Coal Group, will return to his duties with U. S. Steel.

Arthur S. Hecht, consulting mining engineer for the Department of Commerce, recently returned from Korea. He is being retained by the Civil Affairs Section of the Army to act as consultant on technical matters concerning ore beneficiation tests. He may be reached at 342 27th Avenue, San Francisco 21.

Nicholas T. Camicia, of Holden, W. Va., an operating official of the Island Creek Coal Co. and a wartime major of the U. S. Army, was decorated by the Dutch Government for valuable and meritorious services to the Netherlands in operation of the Dutch State Mines after combat troops entered Holland. He was a member of the staff of Col. Robert P. Koenig, president, Ayrshire Collieries Corp., which was organized to rehabilitate and operate coal mines for the U. S. Army in liberated countries.

On the retirement of **Colwell A. Pierce**, general superintendent of the United States Potash Co. at Carlsbad, N. M., **Henry H. Bruhn**, refinery superintendent, was appointed resident manager with general supervision of mining and refinery operations. **Russell H. Mills** succeeds Mr. Bruhn as superintendent of the refinery.

Paul L. Shields has resigned as president of the Sheridan-Wyoming Coal Co., with operations in Wyoming and has accepted the presidency of three coal companies in Utah—Spring Canyon Coal Co., Royal Coal Co., and Standard Coal, Inc. **Walter J. Johnson** will succeed Mr. Shields as president of the Sheridan-Wyoming Coal Co. For some time Mr. Johnson had been general superintendent of the Bell & Zoller Coal and Mining Co. of Illinois and was formerly associated with the Roundup Coal Co. at Roundup, Mont.

M. K. Drury, assistant to the general manager of the Western Smelting Department of American Smelting & Refining Co., was recently transferred from the San Francisco office to the New York office of the company.

Walter J. Tuohy was elected president of the Chesapeake and Ohio Railway to succeed **Robert J. Bowman**, who was named chairman of the executive committee. Mr. Tuohy joined the C & O as vice-president in charge of coal traffic and development in January, 1943. Before coming to C & O he was president of the Globe Coal Co., Chicago, and prior to that had been with other coal companies and with the Illinois Central and Pennsylvania railroads.


Walter J. Tuohy

Harry Wallace Knight, of Toronto, Canada, has been elected to the board of directors of the American Zinc, Lead & Smelting Co. Mr. Knight is president of the Golden Manitou Mines, Ltd., and director and president of International Metal Industries, Ltd., and director of Manitou Quebec Mines, Ltd., and Chesterfield Mines, Ltd. of Canada. He is a partner of Draper Dobie & Co., of Toronto.

Lewis E. Young, Pittsburgh, was elected president of the AIME for 1949 at the November 17 meeting of the board of directors. **Augustus B. Kinzel**, president, Union Carbide & Carbon Research Laboratory and **Philip Kraft**, vice-president, Newmont Mining Corp., were elected vice-presidents. **William J. Coulter**, general manager, Climax Molybdenum Co.; **James L. Head**, mining engineer, Anaconda Copper Mining Co.; **William M. Pierce**, chief, research division, New Jersey Zinc Co., and **George P. Swift**, consulting engineer, are newly elected directors.

Howard O. Gray, mining editor of the *Joplin Globe* and *News Herald* for the last 12 years, has announced his resignation as secretary of the Tri-State Zinc and Lead Ore Producers Association. He resigned both positions simultaneously as of December 1, and he plans to engage in private business. **C. E. Stover** has been appointed secretary of the Tri-State Zinc and Lead Ore Producers Association and took up his new duties November 1, 1948. Formerly Mr. Stover had been associated with Evans-Wallower Zinc, Inc.

Clarence B. Randall has been appointed assistant to President Wilfred Sykes, of Inland Steel Co. Since 1930 Mr. Randall has been vice-president in charge of raw materials. At the same time Edward L. Ryerson, chairman, announced appointments of **P. D. Block, Jr.**, as vice-president in charge of raw materials and **H. W. Johnson** as vice-president in charge of steel manufacturing.


C. B. Randall

Norman J. Andersen is now employed as research metallurgist with the Potash Co. of America, Carlsbad, N. M.

Henry Horner has been promoted from assistant mine foreman to mine foreman at the Hill mine of Consolidation Coal Co. (Ky.), Pike County, Ky.

M. V. Bentley has been promoted from assistant mine foreman to mine foreman at the Consolidation Coal Co.'s (Ky.) Mine 204 near Jenkins, Ky.

B. B. Fritts has been promoted from section foreman to assistant mine foreman of the Consolidation Coal Co.'s (Ky.) Clover Splint mine in Harlan County, Ky.

Charles L. Farris has been appointed director of the Bureau of Field Operations in the NSRB Office of Production.

B. M. Andreas, formerly chief engineer of the Butler Brothers Mining Co., has been promoted to superintendent of the Nashwauk-Cooley district. He is succeeded by **Harry Larson**.

G. H. Bergstrom, chief engineer for the Nelson L. Davis Co., Chicago, has been elected a vice-president. Work is directed toward designing and building coal cleaning plants using the heavy-media float and sink process.

George M. Wunder, formerly in charge of leasing operations for the United States Smelting Refining and Mining Co., in the Tintic, Utah district, has been appointed assistant to the general superintendent of the MacIntyre Division of National Lead Co., Tahawus, N. Y.

John Towers, has been appointed Illinois state mine inspector for District 13. He succeeds John Golden of Du Quoin, Ill., deceased.

Robert I. Williams of Tucson, Ariz., was awarded the $750 scholarship provided by Kennecott Copper Corp. to a senior student at the College of Mines, University of Arizona, majoring in the field of mining engineering. The $500 American Smelting and Refining Co. award went to **Edwin Brown King,** also of Tucson. It was available to a student majoring in the field of metallurgical engineering. Both prizes were awarded on a basis of character, scholarship, leadership, and initiative.

Edmond W. Booker has been appointed superintendent of the Gorgas mine, Alabama Power Co., Gorgas, Ala.

William Sharp, formerly connected with sinking the Fad Shaft at Eureka, Nev., by Eureka Corp., has been appointed consulting engineer and manager of operations at Eureka for the Consolidated Eureka Corp.

Leslie W. Pullen, formerly with the Oliver Iron Mining Co., has joined the engineering department of the Island Creek Coal Co., Holden, W. Va.

Warren Bicknell, Jr., president of the Cleveland Construction Co., was elected to the board of directors of The M. A. Hanna Co. following the resignation of **Richard F. Grant.** Mr. Bicknell is a director of Shattuck-Denn Mining Corp. of New York.

Dr. **Walter H. Voskuil,** mineral economist, State Geological Survey of Illinois, has been appointed professor of mineral economics at the University of Illinois at Urbana and will teach part-time in the University Department of Mining and Metallurgy.

Charles E. Stott, formerly vice-president and general manager, Cia. Minera de Penoles, division of the American Metal Co., Ltd., is now engaged in consulting practice at Monterrey, Mexico.

Eugene McAuliffe, recently retired chairman of the board of Union Pacific Coal Co., will receive the AIME Erskine Ramsay Gold Medal awarded in recognition of distinguished achievement in the production, beneficiation, or utilization of bituminous or anthracite coal. The award will be made at the Institute's annual banquet at the Palace Hotel, San Francisco, February 16.

Frank H. Bishop, vice-president and general manager of the Hamme mine of the Tungsten Mining Corp., Henderson, N. C., has resigned.

C. W. **Thompson** is now assistant manager of Weirton Coal Company.

Lloyd M. Bredvold has been appointed superintendent of the Hibbing district and **Harry A. Larson** has been promoted to the position of chief engineer, Butler Bros.

J. W. Bahen has been appointed assistant to president, in charge of coal traffic and development, for all properties served by the Chesapeake and Ohio Railway.

— *Obituaries* —

Myrl L. Jacobs, vice-president, raw material properties, Bethlehem Steel Co., died November 13, 1948, at Trinidad, B. W. I., where he was making a tour of company properties. Mr. Jacobs was a native of Pennsylvania. He attended Lehigh University and was graduated in 1910 with a degree in mining engineering. After varied experience in the United States and abroad, he was made general manager of quarries for Bethlehem Steel Co. in 1920, and in 1934 became general manager of the stone and slag division. In 1939, he was made assistant to the vice-president.

In 1940 Mr. Jacobs was elected vice-president of the Bethlehem Steel Co. and president of various Bethlehem subsidiary companies engaged in mining. He was elected a director of Bethlehem Steel Corp. in 1940.

He was active in the work of the American Mining Congress and was a member of the AIME, the American Iron and Steel Institute, the Engineers Club of the Lehigh Valley, and the Newcomen Society.

Jack Watt, 48, superintendent of the Moonlight Mining Co., near Princeton, Mont., died on September 19, after several months' illness.

Matthew M. Reese, 71, died recently in Seattle, Wash. A native of Wales, he emigrated to the USA in 1894 and was graduated from the Colorado School of Mines in 1905. At one time he was employed by the Sunshine Mining Co. and was at other times engaged in developing and operating mines.

Edgar C. Mahan, former president of the National Coal Association, and chairman of the board of the Southern Coal and Coke Co., which operates coal mines in eastern Tennessee and southern Kentucky, died October 28, 1948. Mr. Mahan was president of the Southern Mining Co., Southern Collieries, and Mahan-Jellico Coal Co., and vice-president of the Fork Mountain Coal Co.

William Crichton, Jr., Charleston, W. Va., died on October 29 after suffering a heart attack. Mr. Crichton, who was vice-president of the Johnstown Coal & Coke Co., and president of the Greenbrier Coal Operators Association, was well known thruout the coal mining industry. He was a member of the board of directors of the Southern Coal Producers Association.

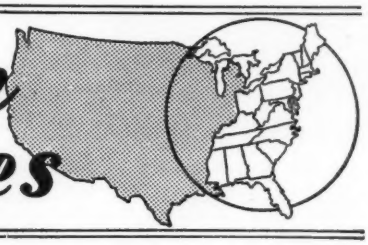
Alfred E. Truscott, 50, office manager of the Verde Tunnel and Smelter Railroad, Clarkdale, Ariz., died at his home on November 9 following a heart attack. He had been connected with the mining company railroad for 23 years.

George John Gmahling, 76, internationally known engineer in the construction of smelting furnaces, died at the Copper Queen Hospital in Bisbee, Ariz., on October 11. Gmahling was born in Calumet, Mich., and spent his early professional life in Great Falls, Mont. He constructed furnaces for the Copper Queen smelter, and those of the Calumet and Arizona smelter. He built furnaces for Cerro de Pasco Copper Co. and for the Rhodesian Selection Trust. Considerable time was spent in Canada, supervising the construction of furnaces for Beatty Gold Mining Co. During four years of World War II he was connected with Phelps Dodge Corp. at Morenci, Ariz.

Charles E. Locke, 74, died on September 24 in Cambridge, Mass., after a long illness. Since 1941 he has been professor emeritus of mining and ore dressing at the Massachusetts Institute of Technology.

NEWS and VIEWS

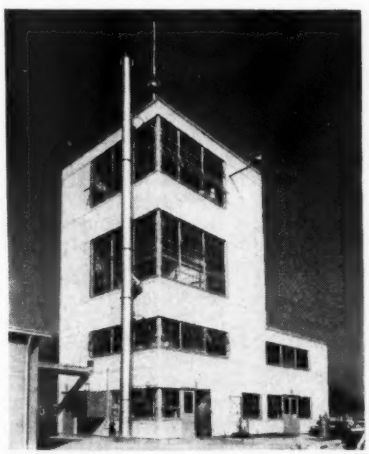
Eastern States



Coal Gasification Pilot Plant

The formal opening of two major projects of the Pittsburgh Consolidation Coal Co., the new pilot plant for the gasification of coal at Library, Pa., and the modernized and enlarged Arkwright mine near Morgantown, W. Va., was held November 15.

In the new pilot plant, designed and built in cooperation with Standard Oil Development Co., gasification is accomplished by the reaction of steam and oxygen with fluidized coal (or char) at a high temperature with a resultant product known as "synthesis gas." The opening of the research center at Library was high-lighted by examples of the work of the research and development division on coal carbonization and on a related study of processing the tar produced by carbonization. The research program is directed toward the development of new ways of processing coal to make products of greater value.



The enlarged Arkwright mine features a new preparation plant and combination rail, river, and truck tipple. Designed originally to operate two shifts daily and to handle the output of the Arkwright mine, plans now are being developed for operating the plant and tipple on three shifts to accommodate the output of a second mine, the Osage, the haulageway of which will connect underground with that of Arkwright. The combined daily output of the two mines will amount to 12,000 tons and will be cleaned and sized at the new Arkwright tipple.

Coal Mining Institute Meeting

At the 62nd Annual Meeting of the Coal Mining Institute of America, held December 9 and 10 at the Fort Pitt Hotel in Pittsburgh, Pa., excellent papers were presented on "Labor Relations in Coal Mines" by Charles O'Neill, president, United Eastern Coal Sales Corp.; "Continuous Mining —Its Effect Upon Operations," by T. G. Ferguson, division superintendent, Pittsburgh Coal Co.; and "Four Foot Shaft Core Drilled for Ventilation and Escapeway," by Paul O. Porter, chief engineer, Lorraine Coal and Dock Co.

On the occasion of the annual dinner, C. M. Donahue, president, CMIA, served as chairman. G. A. Shoemaker, president, Pittsburgh Coal Co., as toastmaster introduced Harry M. Moses, president, H. C. Frick Coal Co., who presented a comprehensive address on the "State of the Industry."

On the second day of the meeting a group of men with thorough experience in vocational training presented a series of papers on this important topic. Papers were also presented on postwar safety conditions in the coal mines of Germany and Japan. E. R. Maize, safety director, National Coal Association, discussed what the industry can do for safety; and C. F. Davis, director of safety, UMW, spoke on the safety program of the UMW.

New Uses Developed for Anthracite Silt

A method of turning accumulated anthracite silt into fuel gas and for squeezing the silt into pellets is one of the latest developments in the program to utilize the 200,000,000 tons of accumulated anthracite silt, one of the anthracite region's greatest unused resources.

To make the fuel gas, the previously wasted by-product is fed into a tall reaction chamber, mixed with air and steam and burned to form a gaseous mixture similar to manufactured "water gas."

The pellets made from the silt are from ⅛ to ¾ in. in size and are suitable for home furnaces and commercial use.

Certificates of Honor Awarded

The first of fourteen awards to men in the mining industries who acted promptly to save lives through their knowledge of first aid was made at Shenandoah, Pa. on November 12. The Bureau of Mines Certificates of Honor supplement the medals awarded by the Joseph A. Holmes Safety Association and recognize instances in which lives have been saved through first aid treatment without personal risk of life.

These first awards go to the following men: Leroy Miller and Don Bishop, Utah Fuel Co., Sunnyside, Utah; Elmer V. Smith and Edward W. Venable, Alabama By-Products Corp., Praco, Ala.; Ray Power, Shell Oil Co., Inc., Houma, La.; Kenneth McElroy and Walter Francisco, Climax Molybdenum Co., Climax, Colo.; Joseph P. Reese, Locust Coal Co., Shenandoah, Pa.; James Brown Dodson, Warren Petroleum Corp., Gladewater, Texas; Fred L. Fender, Warren Petroleum Corp., Maud, Okla.; A. C. Havens, Warren Petroleum Corp., Oak Grove, Mo.; Fred C. Dixon, Stanolind Oil and Gas Co., LaFayette, La.; W. L. Moore, Jr., Texas Company, Tulsa, Okla.; and A. P. Charpiot, Sun Oil Co., Gilchrist, Tex.

West Virginia Coal Mining Institute Holds Annual Meeting

Over 100 members of the West Virginia Coal Mining Institute gathered for the 41st annual meeting on Friday, November 19, at the Hotel Morgan, Morgantown, W. Va. At the morning session papers were presented on "Vocational Education in High Schools," by W. E. E. Koepler, secretary, Pocahontas Operators Association, Bluefield, W. Va.; "Structure of Mine Roofs," by Charles T. Holland, head, mining department, Virginia Polytechnic Institute, Blacksburg, Va.; and "Is Cheap Atomic Power Coming Soon?," by James H. Cunningham, Bituminous Coal Institute, Washington, D. C.

During the afternoon session "Use of Diesel-Powered Equipment Underground," by Martin A. Elliott, assistant chief, research and development branch, U. S. Bureau of Mines; "Present Status of the Coal Mining Industry in European Countries," by G. R. Spindler, director, School of Mines, West Virginia University; and "Continuous Mining," by Gerald von Stroh, director, Mining Development Committee, Bituminous Coal Research, Inc., Philadelphia, Pa., were presented to an interested audience.

At the business session of the Institute outgoing president R. H. Morris, Ansted, W. Va., presided. The new president of the Institute for 1949 is Jesse Redyard, president, Redyard Coal Co., Pineville, W. Va. Cleon Fowler was announced as winner of the 1948 award to the graduating senior in coal mining having the best scholastic record in the School of Mines at West Virginia university. Dr. C. E. Lawall, assistant vice president, Chesapeake & Ohio Railway, presided as toastmaster at the annual dinner, when Holmes Alexander, senior staff editor, Kiplinger's Magazine was guest speaker.

Kerosine Flotation of Fine Coal

The Sloss-Sheffield Co. in Birmingham, Ala., is the first company known to be using the kerosine flotation process on coal fines. The plant has been operating successfully upon slurry water which is usually run to waste. The slurry carries considerable fine coal which increases the washer loss and also creates a stream pollution problem.

The Sloss-Sheffield Co. is using Denver Sub A Flotation machines and

using a large amount of kerosine reagent which imparts peculiar characteristics to the floated fine coal. The dewatering is done by a newly developed mechanical squeezing process which overcomes the problem of dewatering fines.

Based upon the success of the first plant, this company is planning another installation to process mine run minus ten mesh coal.

Glass Firm Buys Coal Mine

The Pittsburgh Plate Glass Co. announced purchase of the controlling interest in the Midvale Coal Co., near New Philadelphia, Ohio. The properties will be operated as the Columbia Coal division of Pittsburgh Plate.

Brown Ore Strip Operation

Shook & Fletcher Mining Co. is stripping on one of the richest deposits of brown ore ever found in Alabama. The operation is located near Woodstock in an area that had been previously mined. They are using a 12-yd walkline dragline and LeTourneau Carryalls to move 125 ft of overburden. The ore is compact requiring blasting before shovels can load into 20-ton, side-dump cars. Present operation is now using hoist haulage but future plans will also include truck haulage.

The log washing plant processing the ore produces approximately 700 tons of shipping ore in a ten-hour shift. The ore contains better than 50 percent iron and is being shipped by rail to the Tennessee Coal and Iron Co. blending plant near Birmingham. It is reported that present reserves have sufficient ore to last four to five years.

Sink-Float Techniques Described to Mechanical Engineers

At the 69th Annual Meeting of The American Society of Mechanical Engineers which concluded on December 3, John T. Sherman, mining engineer, American Cyanamid Co., explained the important part played by sink-float processes in increasing ore reserves. He stated that sink-float plants can be used to grade up submarginal ores to the point where they can be treated profitably. Waste dumps and coarse tailings from less efficient concentration methods can be treated. Cheaper, less selective mining methods can be used and the waste discarded prior to concentration by older, conventional methods. He added that the two largest coal cleaning plants in the world, now under construction, will employ sink-float methods.

New coal washing plant of Robena mine, H. C. Frick Coke Co., in Greene County, Pa., nears completion. The plant will produce high-grade metallurgical coal to boost iron production in U. S. Steel's blast furnaces

Oil from Coal

Two features of the 11th annual fuels conference of the ASME and the AIME on November 3, held at White Sulphur Springs, W. Va., were the program outlined by J. D. Doherty, Bureau of Mines, for the production of 1,000,000 bbl daily of synthetic oils from coal, and the announcement by Paul Averitt of U. S. Geological Survey of a detailed estimate of the coal reserves of the United States now being made by the U. S. Geological Survey.

The synthetic liquid fuels program, based on estimates of the Bureau of Mines, calls for a total investment of 8.7 billion dollars, including plants, mines, and product pipe lines. Geological and economic factors in the program for 1,000,000 bbl a day of oil-from-coal were analyzed by Mr. Doherty, and technological aspects were described in detail.

Pointing out the need for a coal reserve survey, Mr. Averitt said it will require about ten years for completion of the project, though much specific information will be available during that time.

Lead Hygiene Conference

On November 15 and 16 under the auspices of the Lead Industries Assn. of New York City, the Lead Hygiene Conference in Chicago heard an address by Fred M. Gillies, works manager of the Inland Steel Co.'s Indiana Harbor plant on how "The Production Manager Looks at Industrial Health." Other outstanding speakers before the group of about 150 members and guests were Felix E. Wormser, president of the association, and Dr. Joseph C. Aub of the Massachusetts General Hospital.

Consolidation Team Wins Kentucky Safety Championship

The Kentucky State championship in first aid and mine rescue contests held at Middlesboro, Ky., October 15 and 16, was won by the first aid team of Mine 214, Consolidation Coal Co. (Ky.). The team was awarded a large silver cup and each member received individual silver cups, presented by the National Coal Association. The members of the team also received bronze medals from the American Red Cross. Members of the team included: Willie Baker, Kelly Morgan, Warnie Flint, Jr. (captain), Gillie Polly, Quentin Ervin, C. E. Webb, and Covie Amburgey.

Alabama Iron Ore

Tennessee Coal and Iron Co. is operating a strip mine on a body of hematite ore near Bessemer, Ala. This body is isolated from the Red Mountain formation and is reported to be of a higher grade iron than the Red Mountain ores. Truck haulage is used to transport approximately 600 tons per day to a railroad loading station.

New Manganese Sulphate Process Patented

A process for making manganous sulphate from low-grade manganese ore has been patented by Cliff Dougherty, president of Dougherty Chemical Co. of New Bern, N. C. The patenting of the process, which involves the mixture of carbohydrates with strong mineral acids to reduce the manganese to the divalent stage without causing reduction to metallic manganese, may result in the reopening of an $8,000,000 plant designed to recover usable manganese from low grade ores near Las Vegas, N. M.

Contract Awarded

A contract for the building of the Federal Anthracite Research Laboratory at Schuylkill Haven, Pa., has been awarded to the F. H. Evert Co. of Bloomsburg, by the Public Buildings Administration. It is expected that ground will be broken early this winter.

Hussey Co. Celebrates Centennial

The 100th anniversary of C. G. Hussey and Co., Pittsburgh's only copper rolling mill and one of the oldest companies in the region, was celebrated October 28. Ceremonies included a commemorative centennial dinner and a visit to the plant by officials of the company and of the Copper Range Co., Boston, Mass., the parent company.

Engineers for Illinois Coal

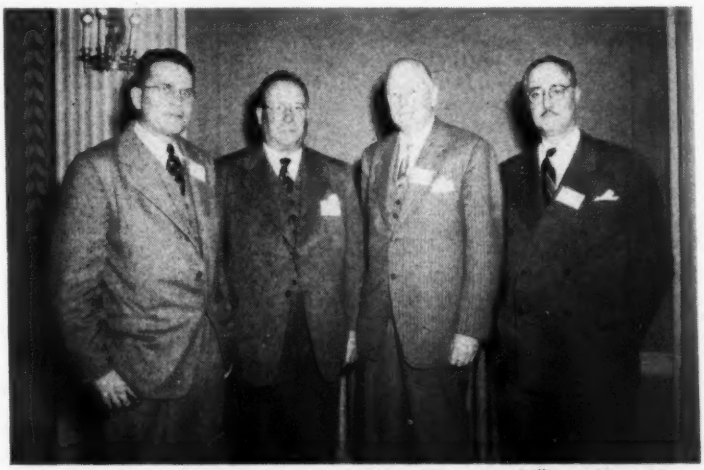
AT the annual meeting of the Illinois Mining Institute, Springfield, Ill., November 5, Henry C. Woods, vice-president, Sahara Coal Co., delivered an outstanding address on the work of Coal Mining Advisory Committee of the Illinois coal industry. This committee has joined hands with the department of mining and metallurgical engineering of the University of Illinois to review the curriculum in mining engineering with a view to changing courses and to deleting old or adding new ones which will properly prepare young men for service in the modern coal mining industry.

The Advisory Committee will also advise on the research program of the University and on the new mechanical devices being built for the coal industry and on matters of safety and accidents in mines. All phases of the coal industry will be considered by the Advisory Committee in making their recommendations for a research program at the University.

Mr. Woods mentioned the proposed plan of the Committee to cover all the high schools in the State of Illinois to interest faculty and students in mining engineering courses at the University. The Committee plans to print a booklet entitled Careers in Mining Engineering which will highlight numerous advantages accruing to engineers employed in the coal industry.

As an essential feature of this vigorous program to provide adequate and capable personnel for the Illinois coal mining industry, construction of instructional research facilities at the University of Illinois were advocated. A new building is required to provide facilities to graduate 60 young engineers each year.

Following Mr. Woods' statement, the Illinois Mining Institute adopted a resolution to take suitable action to encourage the proper authorities to provide the required facilities.



Harold L. Walker, head, department of mining, University of Illinois; Harry M. Moses, president, H. C. Frick Coke Co.; George F. Campbell, president, Old Ben Coal Corp.; and Henry C. Woods, vice-president, Sahara Coal Co., at the meeting of the Illinois Mining Institute

Members of the Coal Mining Advisory Committee include Haroid L. Walker, Dr. W. R. Chedsey, Prof. G. B. Clark, and Dr. Walter H. Voskuil of the University of Illinois, and the following men represent the coal operators: H. A. Treadwell, George F. Campbell, Herbert Taylor, Dave Devonald, B. E. Schonthal, Paul Weir, and Henry C. Woods.

Strip Mine Begins Production

The Seminole Coal Corp., which is affiliated with the Northern Illinois Coal Corp., has commenced operations on a new strip mine near Lenzburg, Ill. Daily production of the new property will eventually be 4000 tons.

Youngstown Mines Corp. Plans Heavy-Media Plant

The contract for a heavy media coal processing plant for Youngstown Mines Corp., Dehue, W. Va., has been awarded to the Nelson L. Davis Co., Chicago, Ill. The plant will handle 350 tons per hour of run-of-mine coal. All plus 4-in. coal will be reduced to minus 4 in., the ¼ by 0 in. will be screened out and the 4 by ¼ in. raw resultant will be processed by the heavy media process. The finished product is to be used for producing blast furnace coke.

Labrador Iron Deposits Similar to Mesabi Range

The high grade iron ore deposits discovered in Labrador have been described as similar to the ores of the Mesabi range in extent and quality. Drilling has now proved approximately 150,000,000 tons of ore with an expected objective of 300,000,000. A typical analysis of the ore shows the following: iron plus manganese, 62.7 percent; phosphorus, 0.101 percent; sulphur, 0.008 percent; silica, 4 to 6 percent. Some of the ore has been found to be high in manganese, running 6 percent or better.

C & H Completes Long Connection

In September the Seneca shaft of the Calumet and Hecla Consolidated Copper Co., Calumet, Mich., holed through to meet the raise from the 33rd level north of Ahmeek No. 4 shaft. The shaft and the raise met exactly, both vertically and horizontally. A combined total of 2050 ft of raising and sinking was required to make the connection. Of this the raise accounted for 1750 ft and the shaft sinking 300 ft. Much credit is due to the engineers who conducted the difficult survey requiring a total of about 800 observations to make the connection.

Oxygen Plant for Coal Gasification Completed

The first tonnage oxygen plant to be used for coal gasification purposes in this country was placed in operation in November at the coal-to-oil demonstration plants of the Bureau of Mines at Louisiana, Mo. Originally used by the I. G. Farbenindustrie in making acetic acid and other chemicals at Hochst, Germany, this modern Linde-Frankl unit was dismantled and reerected in the United States. The plant, which will extract oxygen from the atmosphere, has a capacity of

23,000 cu ft or 1 ton per hour of 98 per cent oxygen.

The coal gasification cycle in which Linde-Frankl unit will be used involves crushing, pulverizing, and drying the coal. Then the pulverized coal is fed to a reactor, together with oxygen and steam or carbon dioxide. Under high temperatures, the mixture reacts to form synthesis gas—the carbon monoxide and hydrogen required in the Fischer-Tropsch process and a source of hydrogen for the coal hydrogenation process for producing synthetic liquid fuels.

Several Iron Range Plants Closed for Season

The Hanna Ore Co. has closed its sintering plant at Crosby, Minn., on the Cuyuna range, and the Hanna Coal and Ore Co. has closed the Maroco washing plant as well. The M. A. Hanna Co. has discontinued mining at Spring Valley, Minn., for the season.

Cleveland-Cliffs Iron Co. has closed all its washing plants on the Mesabi range for the coming cold season. The three washing plants, the Holman-Cliffs, Hill-Trumbull, and Canisteo, are located on the western Mesabi range.

Nellie B Company Acquires Properties

After recently acquiring the properties of the Rialto Mining Corp. and earlier this year having purchased the holdings of the Marcia K Mining Co. and the Davis-Big Chief Mining Co., the Nellie B Company has acquired mining and milling properties and holdings of the Evans-Wallower Zinc, Inc., in the heart of the Picher mining field. The No. 4 mines and mills and all mining and milling equipment were taken over on September 8, and milling operations were begun on September 21. J. H. Buchanan, previously associated with the Atlas Powder Co. in Chicago, is now manager of the Nellie B company's Tri-State properties.

Lake Linden Dredge Ceases Operation

The Lake Linden reclamation plant of the Calumet and Hecla Consolidated Copper Co., in upper Michigan, is being permanently closed as available sand is almost exhausted. For over 30 years of its operation this activity of the company has been a large contributor to the company's earnings. The Lake Linden plant is the largest tailings retreatment plant ever erected.

Through September, 1948, the plant had recovered 413,133,823 lb of copper from 36,646,000 tons of sand. Upon closing the plant the dredge will be transferred to the Tamarack dredging operations on Lake Linden for operation there, and the present Tamarack dredge will be placed on sale.

Eagle-Picher Purchases Smelting Plant

The Eagle-Picher Mining & Smelting Co. which has been operating a smelting plant at Henryetta, Okla., since June 1, 1942, recently purchased the property from the War Assets Administration. Involved in the sale is 20 acres of ground, 11 buildings, equipment and machinery, and other facilities including a spur rail line. The plant was purchased for $80,000.

Snapp Mill Ceases Operations

Ross Blake, Tri-State manager of Kansas Explorations, Inc., a subsidiary of St. Joseph Lead Co., recently announced the closing of the Buckingham mines and the Snapp mill. Mr. Blake stated that insufficient ore reserves made the cost of continued pumping unjustified. Equipment now at the Buckingham property was moved to the Snapp mill for storage.

Bristol Mine Begins Production

The Bristol Mine of the Inland Steel Co. at Crystal Falls, Mich., has completed unwatering and mining operations have begun. Shaft equipment originally located in the Holmes mine at Ishpeming has been rebuilt and modernized with post-type brakes replacing the original band type brakes.

Armco Holds Extensive Reserves

Along with its recently acquired interests in Butler Brothers, the Armco Steel Corp. holds a one-third interest in the Reserve Mining Co. which has under lease enormous reserves of magnetic taconite on the Mesabi Range in Minnesota. Charles R. Hook, chairman of Armco Steel Corp., in commenting on the company's ore reserves stated, "With the ore which will come to Armco through the new arrangement and our interest in Reserve Mining, Armco's ore requirements are taken care of for at least 100 years at our present rate of consumption."

Double Attack ON DIGGING COSTS!

This pair of P&H Model 1400 Electric Shovels (4 cu. yds. capacity) is stripping and loading copper ore for the Inspiration Consolidated Copper Company at Inspiration, Arizona.

● More and more users are reordering P&H Electric Shovels to insure steady operation — lower costs. P&H's air-filtered cab is a case in point.

To protect electrical equipment from abrasive dust and dirt, a highly perfected ventilating system filters all air which enters the P&H cab. Only clean, fresh air rushes through motors and generators. Once used, it's exhausted directly to the outside—*not recirculated.* This important safeguard keeps electrical units at full efficiency, prevents damage to equipment, increases productive time. Like Magnetorque Drive and independent propel, it's another important P&H added value.

Every third P&H Electric Shovel sold is a repeat order

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LEADING THE FIELD IN ELECTRIC SHOVEL DEVELOPMENTS

Celebrate 10th Anniversary of River Shipment of Coal

Early in November executives of the United Electric Coal Cos. and Marquette Cement Manufacturing Co. celebrated the 10th anniversary of the first river shipment of coal from United Electric's Buckheart Mine dock at Liverpool, Ill., to the Marquette cement plant at Oglesby, Ill. In the ten year period, 1,500,000 tons of coal have been transported by water between the two points.

Warner Iron Mine Acquired by North Range Mining Co.

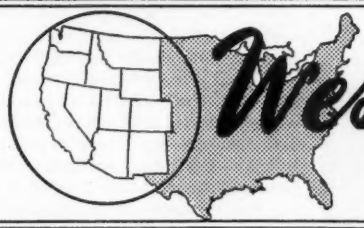
The Warner shaft iron mine at Amasa, Iron County, Mich., on the Menominee iron range, has been acquired by the North Range Mining Co. The Warner was first opened in 1916 by underground mining by the Hemlock River Mining Co.

New Slope Mine Developed

Franklin County Coal Corp. is developing a new slope mine near Royalton, Ill., on an 1800 acre tract having sufficient coal reserves for 10 to 12 years of operation. Plans call for operations to begin in the spring of 1949. Coal produced from the new operation will be prepared at the Royalton No. 7 cleaning plant.

Natural Resources Committee, Chamber of Commerce

Appointment of Dechard A. Hulcy, chairman of the Natural Resources Committee, Chamber of Commerce of the United States, for the year 1948-1949, was recently announced. Members of the mining industry serving on the Natural Resources Committee are Donald A. Callahan, president, Callahan Consolidated Mines, Inc.; G. F. Coope, president, Potash Co. of America; James D. Francis, president, Island Creek Coal Co.; Donald B. Gillies, president, Lake Superior Iron Ore Assn.; Evan Just, director, Strategic Materials Division, Economic Cooperation Administration; E. R. Keeler, chairman of the Board, Franklin County Coal Corp.; J. C. Kinnear, vice-president, Kennecott Copper Corp.; Robert P. Koenig, president, Ayrshire Collieries Corp.; Lawrence Litchfield, Jr., vice-president, Alcoa Mining Co.; F. S. Mulock, vice-president and general manager, U. S. Smelting, Refining and Mining Co.; J. H. Oliver, vice-president and general counsel, Glen Alden Coal Co.; and James Prendergast, vice-president, The M. A. Hanna Co.



Western States

Princeton Mine Showing Ore

The Spokane offices of the Princeton Mining Co. recently reported that favorable results have been obtained from the exploration and development program at property holdings in the Philipsburg quadrangle, Mont. Drifting on the 110-ft level of the Saranac claim, above Maxville has been in strong ore structure for about 200 ft showing higher grade milling ore and some shipping material. The company plans further mining development and mill construction.

Colorado Dredge Operation

Only one bucket-line dredge is operating in the state of Colorado at present. Entering into its fourth year of postwar operation, the 2500-ton gold dredge of the South Platte Dredging Co. is working on the middle fork of the South Platte river southeast of Fairplay at the rate of 14,000 cu yd a day—and a gold brick a week.

Terms for Uranium Ores from Indian Reservations

The known uranium deposits on the Navajo Indian Reservation in northern New Mexico and Arizona, are to be exploited in accordance with a contract recently negotiated by officials of the Bureau of Indian Affairs, the U. S. Atomic Energy Commission, and the Vanadium Corporation of America.

According to John H. Provinse of the Indian Bureau, leases held by AEC have been subleased to Vanadium Corporation of America. These were the ones originally held by Union Mining Co., the secret wartime producer of uranium for the atomic bomb.

The contract provides that the Navajos shall receive ten percent of the gross sale price of all the minerals taken from their reservation, and from 20 to 30c a pound for all vanadium ore production where the uranium oxide content is 11 percent or under. Other terms of the contract forbid any future study of the Navajo receipts to disclose the amount of uranium actually taken from the reservation in this uranium mining program.

Any production of the Indian reservation probably will go to the Durango, Colo., plant for treatment. This plant is one of two plants which is to be brought into operation in 1949 by the Vanadium Corporation of America. The other will be a pilot treatment plant to be set up in the White Canyon district of San Juan County, Utah, where copper-uranium ore bodies are known to exist.

The Southeast Utah area has never been exploited for uranium, but commission geologists have found scattered deposits extending through the area and into northern Arizona. The Durango plant will utilize deposits from the Colorado plateau, which already is a major source of domestic supply.

Under the terms of the agreement covering the government-owned plant at Durango, the Vanadium Corporation of America will rehabilitate the plant at an estimated cost of $200,000. The plant, a vanadium mill formerly owned by U. S. Vanadium Corp., has been idle for some time, but present plans call for resumption of operations late in 1949. The ore supply will come principally from mines operated by Vanadium Corporation of America. However, independent operators will be able to deliver ores under the terms of the AEC's ore purchasing program.

Wyoming Resource Study

Wyoming's state department of commerce and industry is making a list of all natural resources to be found in that state. It will include the various kinds of resources, where they may be found and in what quantities they are available. Dr. H. D. Thomas, state geologist, and Dr. Henry Fiske, director of the natural resources and research institute at the University of Wyoming, will direct compilation of the information. When all the facts are in, the department will make the information available to all interested in the development of Wyoming resources.

Tonopah Activity

Diamond drills are probing the old Mizpah mine, near Tonopah, Nev., for new ore. Two drills are exploring the block faulting of the property from several levels with 40 to 50-ft holes. The Mizpah was the first major mine in the Tonopah district, and was Nevada's leading silver-gold producer for many years. It is now held under lease from the Tonopah Mining Co., by Clyde Russell. Several lessees are mining ore in developed areas of the company, with ore shipments to the McGill smelter of the Kennecott Copper Corp., near Ely, averaging 100 tons per month. High costs restrict production to ore assaying $20 per ton. A few lessees are mining rich ore. Calumet & Hecla Consolidated Copper Co., of Michigan is drilling its sixth deep hole on its holdings north of Tonopah. Previous holes have varied from 1000 to 2000 ft deep vertically. Most of the work has been done near the Belle of Tonopah and King of Tonopah claims. The company is reported to be seeking extensions of veins mined years ago in the adjacent Tonopah Extension mine.

Clayton Silver to Explore Deeper Levels

Clayton Silver Mine in Custer County, Idaho, is preparing to sink to the 400-ft level as a preliminary step toward exploration of the downward extension of the ore shoot now being mined on the 300 level. The ore shoot on the 300 level is being exploited by shrinkage stoping. Mill feed averages about 3½ per cent lead, 1½ per cent zinc and 4 oz of silver per ton.

Nevada Dredge Nears Completion

In a recent interview, James O. Greenan of Reno, Nev., stated that construction of the large bucketline dredge at the Greenan placer property was over 50 percent completed and plans call for actual operation early in 1949. The area to be worked comprises several thousand acres about 14 miles southwest of Battle Mountain, in Lander County, Nev. Extensive drilling in 1939 is said to have proven a workable deposit of 60,000,000 cu yd. The Natomas Co. has operated a dragline dredge on the shallow portion of the deposit for the past two years and it handled about 1,000,000 cu yd per year. The dredge equipped with 11-cu ft buckets will enable handling of more than 4,000,000 cu yd per year.

New Smelting Process Claimed

Albert J. Koebel, of Sandpoint, Idaho, claims to have invented a new process of smelting ores that is much cheaper and more efficient than any process now in use. The new process, according to Koebel, consists in feeding ore in powdered form to a furnace heated to 2400 F. When the fine ore particles come in contact with the heat they explode and, mixing with oxygen, they become oxides. In the gaseous oxide state the product is blown through pipes to a bag-house plant, where final metal recovery is made. The inventor claims a 100-ton capacity plant would cost only about $100,000.

Army Engineers Survey Montana Coal

Army engineers are making a survey of some of the bituminous coal fields in southeastern Montana to determine potential productive capacity of coal deposits there for use in manufacturing synthetic fuels.

Lucky Friday Plans Sinking

The Lucky Friday Silver-Lead Mining Co. has 5000 tons of ore stockpiled for treatment at Golconda custom mill. It is now producing at the rate of about 50 tons per day. Arrangements have been completed preparatory to sinking from the 1400 to the 2000 level of the mine.

Bulldozer Traces Outcrop

The Pacific Mutual Silver-Lead Co., near Keller, Wash., has recently completed another 5000 lineal feet of bulldozing to further trace the vein system in the property. Veins and ore shoots in two additional places were disclosed by this project, according to C. A. Gray, manager of the mining company. It is planned by the management to diamond-drill in the spring to determine at greater depth six known veins and ore shoots.

Ray Open Pit Progress

Ray Mines Division, Kennecott Copper Corp., is making progress with preparations for open-pit mining at Ray, Ariz. The first step, the diversion of the flow of surface water in Copper Canyon, has been accomplished by cutting a channel and building a dam so that seasonal flow of water will be discharged into another canyon away from the ore zone. Current production averages 6000 tons a day. However, as soon as maximum production is possible from the pit it is planned to reduce the underground tonnage, supplementing it with sufficient tonnage from the pit to give a combined production of 15,000 tons daily.

1949 Metal Mining Convention

Plans for the 1949 Metal Mining Convention at Spokane, Wash., are in the development stage. Under the Chairmanship of Stanly A. Easton, president, Bunker Hill and Sullivan Mining and Concentrating Co., the Western Division of the American Mining Congress is looking ahead to an outstanding meeting. With William J. Coulter, general manager, Climax Molybdenum Co., as Program Committee Chairman, leading mining men will confer to select topics for presentation.

STANLY A. EASTON

Stanly A. Easton has achieved world-wide recognition in mining for his prominent part in the development of Bunker Hill and Sullivan, one of the great lead-silver-zinc mining companies of the world. William J. Coulter is known throughout mining circles for his signal success in the development of the world's largest molybdenum mine.

WM. J. COULTER

The 1949 meeting will not have an exposition, in accordance with the established two-year schedule. On September 26-28, 1949, Spokane will be the meeting place for mining men from every mineral-producing state in the country.

A Central Housing Bureau will handle all reservations. Requests should be addressed to Housing Bureau, American Mining Congress, Davenport Hotel, Spokane, Wash.

Silver King Coalition Increases Pumping Capacity

Additional pumping equipment has been installed by the Silver King Coalition Mines Co. for handling the flow of water from its "1960 ore body." Present equipment is pumping 4600 gpm and pumping capacity has been increased from 7500 to 9500 gpm to provide an ample safety margin for developing and mining this ore body.

Saranac Mining Co. Makes Headway

"Production is steadily gaining at Saranac Mining Co.'s operation, Maxville, Mont.," according to mine manager Thomas McBride. Higher grade ore from three shoots are being shipped direct to smelters, while milling operations have been stepped up, officials reported. Meanwhile the raise from the deepest tunnel level, at 560 ft, is almost completed to an intermediate level, 120 ft higher, and should soon be connected with the shaft on this horizon. This deadwork was undertaken for ventilation and to provide a second safety exit. A second raise of the same height is planned before commencing stoping. The main ore structure of the Saranac ranges from 25 to 55 ft in width. Top slicing and caving methods will be employed with 50-ft heights to be broken and mined. The management believes that milling operations will

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of THE MINING CONGRESS JOURNAL, published monthly at Washington, D. C., for October 1, 1948.

City of Washington,
District of Columbia, ss:

Before me, a notary public in and for the state and county aforesaid, personally appeared Bertha C. Wilkerson, who, having been duly sworn according to law, deposes and says that she is the business manager of THE MINING CONGRESS JOURNAL, and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor and business manager are:
Name of publisher, The American Mining Congress, Washington, D. C.
Editor, Sheldon P. Wimpfen, Washington, D. C.
Business manager, B. C. Wilkerson, Washington, D. C.

2. That the owners are: The American Mining Congress—a corporation, not for profit. No stockholders. President, Howard I. Young, St. Louis, Mo.; Secretary, Julian D. Conover, Washington, D. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

BERTHA C. WILKERSON,
Business Manager.

Sworn to and subscribed before me this 4th day of October, 1948.

KATHRYN A. HATHAWAY,
Notary Public.
(My commission expires July 31, 1952.)

be maintained on a 100-ton a day basis. A five and a half ton shipment of lead-silver concentrates recently returned $264 per ton, before royalties. Known ore resources indicate three to five years' capacity milling. The company is largely Spokane owned.

Copper Canyon Mills Ore From Lower Levels

According to a recent announcement from L. E. Whicher, president, Copper Canyon Mining Co., near Battle Mountain, Nev., is now producing lead-zinc-silver ore from the Hornfels ore body on the 700-ft level of the Julie shaft. The Hornfels ore body is estimated to contain about 70,000 tons of proven ore and 67,000 tons of probable ore.

About 150,000,000 gal of water were pumped in the unwatering program required to reopen the 700-ft level. The flow is said to have diminished, and diamond drilling will be utilized to explore the lateral extension of the ore body.

The originally plotted width of the ore body of 1120 ft has already been exceeded by 20 ft in the westward crosscut and ore of higher grade is being cut. Recent increases in lead and zinc prices indicate that Hornfels ore will have a value of approximately $25 a ton.

At the present time about 75 tons of ore from the Hornfels ore body are being milled daily and production is gradually being stepped up to reach the full mill capacity of 350 tons. When the full production is obtained, about 200 tons of ore daily will come from the Hornfels ore body.

Hypotheek Completes Unwatering

Unwatering of the Hypotheek mine in the Coeur d'Alene district of Idaho has been completed to the 700 level. Timber repair, including replacement of ladders, lagging, and guides, in addition to 10 by 10 in. shaft timbers delayed pumping considerably. When repairs have been completed it is planned to open the east end of the 700 level beyond the fault which apparently cut off the ore body. A south crosscut is planned to seek the displaced vein, from which over $500,000 was produced when the price of lead was approximately 8c per pound.

Copper-Molybdenum Exploration

Exploration by churn drilling has been started on a large group of copper-molybdenum claims 7½ miles from Miami, Ariz., by the Miami Copper Co. Options have been taken by the copper company on the Lonesome Pine group of six claims, the Esther group of three claims, and the St. Anna group of four claims from J. N. Santa Anna of Miami, as well as on a number of surrounding claims. Preliminary to the launching of the drilling campaign, considerable road building was necessary. The exploration program is being directed by John Gray, geologist, and Joseph C. Van De Water, mining engineer, both of the Miami Copper Co. staff.

Hydro Drill Jib Achieves Good Results

By RAY W. JENKINS
Special Representative, Joy Mfg. Co.

ORIGINALLY planned for fast driving four headings in 24 hr of operation, the Hydro Drill Jib has successfully drilled, with experienced men, as many as four headings on a single shift. The Hydro Drill Jib has been used to good advantage for over 24 months on the development level of a large Montana copper mine. Likewise, other mines in Montana and elsewhere have met with outstanding success in using the jib to speed up the cycle of drilling and blasting operations.

Advantages offered by the jib are: speed in setting up; speed of drilling; simplicity of operation for unskilled men; reduction of manual effort by power feed; operation of two machines by one man, flexibility of drill angle; economy in equipment—less equipment is required for the footage drilled and nipping is almost eliminated; high safety factor as drill operators stand well back from the face at time of collaring; jib pulls stuck steel with power feed; and the centralizer used in collaring assures lined-up holes. The accompanying chart shows the unusual speed attained in setting up, drilling, and tearing down the jib.

Location	Steel Size	Starter Size	Air Pressure	Ground Condition	Drift Size	Type of Round	No. of Holes	Av. Hole Length	Set up Time	Drilling Time	Tear down Time	Average Drilling Speed
U. S. Grant Easton Tunnel	9 ft	1¾ in.	2 drills 62 lb	Med. Hard Granite	8x9½ ft	Burn cut	21	140 in.	15 min	125 min	7 min	15.1 in./min
Copper Mine	8 ft	1¾ in.	2 drills 70 lb	Granite Pyrite Stringers	8x9 ft	Burn cut	27	84 in.	12 min	96 min	10 min	18.4 in./min
Copper Mine	8 ft	1¾ in.	2 drills 75 lb	Med. Hard Ravelly Granite	8x10 ft	Burn cut	27	81 in.	9 min	80 min	5 min	17.8 in./min.

BOOK REVIEWS

BITUMINOUS COAL FACTS AND FIGURES, *Bituminous Coal Institute, Washington, D. C. 1948. 148 pages.*

THIS well-illustrated booklet presents an excellent statistical picture of our foremost fuel industry. Various aspects of the industry are considered in detail in chapters covering reserves, production, distribution, consumption, mechanization, labor, and finance.

Numerous graphs and pictorial charts enable the reader to grasp vital information readily. On every phase of the industry detailed information, such as the production by thickness of seam, the number of companies and affiliated groups with production classified by size, gross ton miles of freight powered by various fuels, long range improvement in mine safety, and productivity per man day by methods of loading is presented. This comprehensive volume is an exceptionally complete analysis of the bituminous coal industry.

FROM THE GROUND UP. *By Paul M. Tyler. McGraw-Hill Book Co., Inc. New York. $3.50. 1948. 248 pages.*

IN A highly readable form, the author has approached the subject of mineral economics from a new angle. The mining industries are considered in their relationship to the national economy to show clearly the close bond between mineral development of the country and its overall welfare. Many of the problems of the mineral industries that require solution for America to achieve the full benefit of her great natural resources are cited with an analysis that points the way towards solutions which should assure adequate supplies of minerals for the normal growth of our economy.

THE ECONOMICS OF MINING. *By Theodore Jesse Hoover. Third Edition. Stanford University Press, Stanford, Calif., 1948, 551 p. $7.50.*

EMBRACING every phase of economics as applied to the mining industry, Mr. Hoover has revised this accepted standard volume on the subject. In the preface of this third edition, the author reaffirms his mental attitude by saying "the attitude of mind in this edition is the same as that in former editions—a strong belief in the endurance of democracy and the profit system and a determination to make them work. Under any other hypothesis the whole of the argument in this book falls to the ground. Only under such alien systems as collectivism, absolutism, and tyranny can metals be produced at a loss."

As in former editions, the book is divided into three parts, covering mine valuation, mine organization and mine management. Each topic has been discussed in the light of the most up-to-date information available. Thorough in every respect, the book speaks for the broad knowledge of the author and the great volume of research that was undertaken to provide practicing engineers and students in mining with a complete analysis of mining economics.

STRATEGIC MINERALS. *By John B. DeMille. McGraw-Hill Book Co., Inc. New York. $7.50. 1947. 626 pages.*

AS MORE and more materials are defined as essential for a war emergency, we need greater knowledge of world sources of supply. In any future emergency more complete knowledge of their chemical and physical properties will be of the greatest importance to the proper prosecution of both economic and physical warfare. Mr. DeMille has approached the subject of strategic minerals from this viewpoint to provide basic information on 76 strategic metals and minerals.

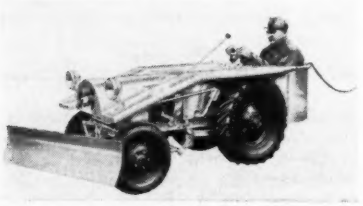
HEAVY-DENSITY SEPARATION —A REVIEW OF ITS LITERATURE. *By John W. Hyer, Jr., Colorado School of Mines, Golden, Colo. $1.00. 1948. 94 pages.*

THIS review is based on technical articles and publications and on information submitted by those familiar with the various processes discussed and the manufacturers of equipment used in the processes. The discussion should serve to inform operators in a general way concerning heavy-density processes that have been applied to ore and coal beneficiation in America and abroad.

Manufacturers Forum

Low Height Angle Dozer

A new low height angle dozer was recently introduced to the mining industry by A. E. Pickard. The new "Handy Andy" trackless utility unit will be produced and distributed by the Central Mine Supply Co., Mount Vernon, Ill. One model of the unit,



designed for trackless low-seam underground haulage, is electrically powered and the other is powered by a gasoline engine for surface dozer work. The underground unit has been engineered to take only 31 in. of height, with the operator's seat built down to within about 6 in. of the ground. The underground "Handy Andy" is 7 ft in over-all length and has a 6-ft turning radius. It is designed to maintain shuttle car roads, clean track, tow supplies and perform other underground tasks. The engineering features enable the unit to maneuver in narrow areas and panelways.

The above ground "Handy Andy" stands 3½ ft in height with an over-all length of 7 ft. It is built to do general utility work. Central Mine Supply Co. production plans call for availability of the "Handy Andy" within 60-90 days.

Synthetic Pipe

A new flexible synthetic pipe claimed to be resistant to both acid and alkali has been developed by Carter Products Corp. to meet the needs of low pressure mine operation for pressure, suction, and sprinkler applications. Carlon E was first installed a year ago in mines of some of the representative coal companies. It was found to be satisfactory because of its flexibility, light weight, and ease of installing and handling. A 200-ft section of the 2-in. pipe weighs only 100 lb—1/7 the weight of steel pipe of comparable length and diameter. Only one coupling is required to each 200-ft section, a feature which increases the ease and speed of installation. In addition to a rigid plastic coupling designed by Carter Products Corp., other standard types of couplings can be used.

Powder-Actuated Driver Simplifies Pipe Hanging

A smaller copy of the original powder-actuated driver developed by Mine Safety Appliances Co. for use by the Navy during World War II has been designed for embedding studs in steel or masonry by the dis-

Storage Battery School Graduates Maintenance Men

With the object of having men on the job thoroughly familiar with the care and maintenance of batteries and so trained that they can organize battery maintenance classes at the mines, the Gould Storage Battery Corp., recently completed the 22nd session of the Storage Battery School at Trenton, N. J.

The full facilities of the Trenton plant, laboratory, and staff were put at the disposal of the battery school for the full week training period held November 8-12. The comprehensive course comprised a series of classes for training battery technicians for the maintenance of batteries and associated equipment, and their application, with the aim of increasing the ton miles delivered by storage batteries.

Nine coal-mine maintenance men receive diplomas. Left to right are: (front row) T. B. Wolfe, equipment inspector, Olga Coal Co., Coalwood, W. Va.; Fred Norris, battery inspector, Olga Coal Co., W. Va.; M. W. Heinritz, Gould vice-president; Sam Pellerite, electrical engineer, maintenance department, Consolidation Coal Co., Fairmont, W. Va.; Joe Varson, maintenance foreman, Consolidation Coal Co., Jenkins, Ky.; Victor Mullins, maintenance foreman, Consolidation Coal Co., Jenkins, Ky.; (back row) John Kalasky, shop foreman, Eastern Gas & Fuel Assocs., Kimball, W. Va.; Allen Obenshain, mechanic, Republic Steel Corp., Praise, Ky.; Paul Jones, maintenance foreman, Eastern Gas & Fuel Assocs., Grant Town, W. Va.; Wayne Bitner, research asst., Pennsylvania State College, State College, Pa.; and Mike Sidick, master mechanic, Castle Shannon Coal Co., Coverdale, Pa.

charge of a blank cartridge. The 5-lb tool will drive a ⅜-in. or ¼-in. stud in a matter of seconds and simplify the fastening of pipe hangars to concrete or metal.

Diamond Bit Reaming Shell Standards

After a thorough study of field conditions and users' requirements throughout the mining field, the technical committee of the Diamond Core Drill Manufacurers Assn. has recommended coring bit and reaming shell dimension standards. Copies of the standards may be obtained from the Diamond Core Drill Manufacturers Assn., 90 West St., New York City.

New Hard Boiled Hat

A plastic molded hard boiled hat made of a new waterproof material was announced at the American Mining Congress San Francisco meeting by E. D. Bullard Co. The hat is said

to be completely moisture proof and non-conductive. A wide web hammock in combination with the resilient crown of the hat is designed to absorb impact from falling objects. One hard boiled hat fits all heads by adjustment of the head band.

Mine-Ventilation Pressure Recorder

A mine-ventilation pressure recorder has been announced by the Bristol Co., Waterbury, Conn., designed on the same basic principles as used in the company's mine-ventilation recording gauges for the past 40 years. Incorporated in the new model are a number of features designed to make them easier to use and more convenient to service. The modern case features a heavy inlaid sponge-rubber gasket to keep the instrument free from moisture, dust, and fumes. The measuring element has been improved to increase accuracy and the ease of adjustment. The instrument has a range of 4 in. of water pressure to 0 to 4 in. of water vaccum. It is available with 24-hour or 7-day chart drive.

A four-flight Goodyear conveyor belt moves limestone from the quarry of the Blue Ridge Stone Corp., near Roanoke, Va., at the rate of 350 tons per hour on a three-quarter mile haul to the processing plant

Wire Rope Film

A four-color sound film entitled "Indian Paint" portrays the making of steel from ore to finished product—wire rope. Arrangements may be made for showing the educational and entertaining film by writing to the Colorado Fuel & Iron Corp., Wickwire Spencer Steel Division, Palmer, Mass.

— *Announcements* —

John A. McMaster has been appointed representative of **Kennametal Inc.**, Latrobe, Pa., for mining district No. 3 and will be located at Superior, Wis.

* * *

Pittsburgh Gear Co., Pittsburgh, Pa., recently appointed **James M. Lawless** to cover eastern, central, and western Pennsylvania, eastern Ohio and northern West Virginia. **George R. Hosey** was appointed to cover southern West Virginia, eastern Kentucky, and Tennessee. **William H. Brown** was appointed field sales and service engineer and **John B. Kraeling** and **A. J. Keefe** were assigned sales and service positions in the Pittsburgh metropolitan area.

* * *

A. Stazicker has been appointed purchasing agent of the **Climax Molybdenum Co.** at its Denver offices effective December 1, 1948. **S. W. Swenson** was appointed assistant purchasing agent effective November 1, 1948.

* * *

Roland Whitehurst, Exide sales manager, has been elected vice-president in charge of sales of the **Electric Storage Battery Co.**, Philadelphia.

Wendell V. Richards has been named central sales manager for **R. G. LeTourneau, Inc.**

* * *

M. J. Gleason, formerly employed by the U. S. Government in charge of diamond drilling in the Panama Canal zone, has joined the **E. J. Longyear Co.**, as superintendent of contract diamond drilling on the Mesabi iron range.

* * *

M. Dean LaGrange, Jr. has joined the staff of the **Eimco Corp.** as chief applications engineer. Mr. LaGrange was formerly superintendent of mines, Ray Mines Division, Kennecott Copper Corp. at Ray, Ariz.

* * *

G. R. Davis has been promoted from assistant sales manager to sales manager of **The Baker-Raulang Co.**, Cleveland.

* * *

George T. Williams, manager, contractors' equipment department of **The Mine and Smelter Supply Co.**, has resigned effective December 31, 1948.

* * *

Pennsylvania Crusher Co., Philadelphia, has acquired exclusive manufacturing and sales rights in eastern United States and Canada for the Kue-Ken line of jaw crushers and gyratory crushers.

* * *

George H. Chapman of Mines Engineering Co., Chicago, has been named an Officer of the Order of Leopold II by the Belgian Government for services rendered that country while he was serving as a major in the Army of the United States.

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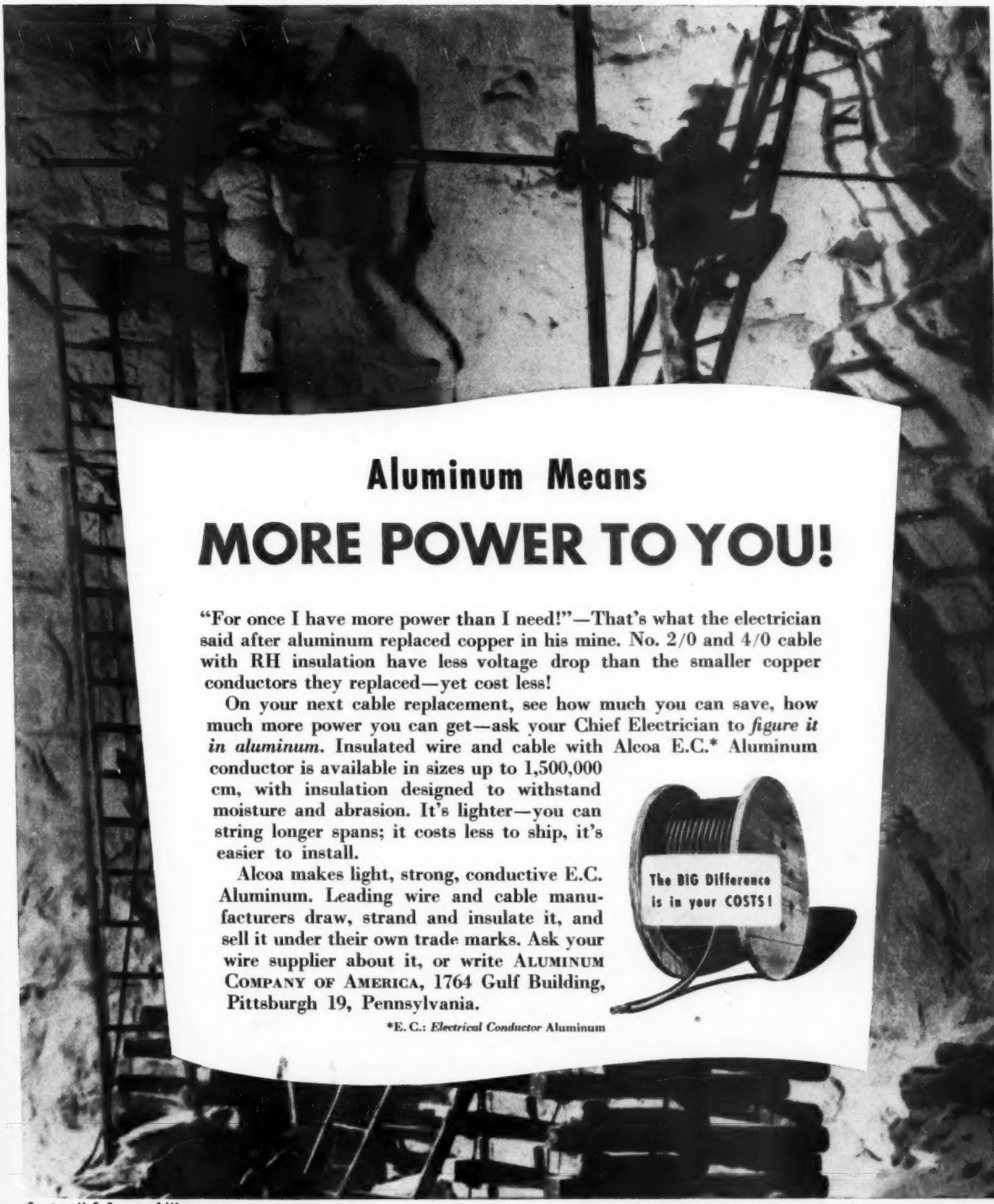

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*E. C.: *Electrical Conductor* Aluminum

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